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Development Policy

Comm. (Cotton)

1976 (Feb - March)



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30124859



INTERNATIONAL FINANCE CORPORATION
OFFICE MEMORANDUM

TO: Mr. Wouter Tims, Director, EPD through Mr. K. Takeuchi DATE: March 3, 1976
ET Acting Chief, EPDCE

FROM: Elton Thigpen, Economist, EPDCE

SUBJECT: Cotton: International Integrated Research and Development

*File
commodity*

1. You may recall that the Economic Analysis and Projections Department was invited to participate recently in two meetings chaired by Mr. Warren Baum to discuss the Bank's response to a report and recommendations prepared by Dr. George Harrar's team on an international integrated program of research and development for cotton. The various issues involved were reasonably sorted out during those discussions between Bank personnel and the authors of the report. The attached memorandum from Mr. Baum to Mr. McNamara summarizes those issues. Furthermore it recommends that the Bank accept the main conclusions of the Harrar report that cotton research is a priority item for international action but that we consider that many issues remain to be resolved before a viable proposal can be placed before potential donors.

2. I understand that Mr. McNamara has approved Mr. Baum's recommendation and that funds have been allocated to enable the Bank to play a more active role than heretofore in steering this enterprise.

cc: Messrs. Hollis Chenery
A. Karasmanoglu ✓
E. Grilli
M. Haq

EThigpen:jmca

OFFICE MEMORANDUM

TO: Mr. Robert S. McNamara
Warren C. Baum

DATE: February 24, 1976

FROM: Warren C. Baum

SUBJECT: Cotton

1. You may recall that the Bank, together with UNDP and the Rockefeller Foundation, commissioned Dr. George Harrar to assemble a team to draw up a program of research and development for cotton. The report was completed in September 1975 and was forwarded to you on September 29, 1975 by Michael Hoffman. This report raised a great many interlocking issues, ranging from purely technical problems to thorny questions of institutional design, and it has taken some time to discuss them with the authors of the report and within the Bank. The issues are now reasonably well sorted out, and the purpose of this memo is to recommend to you that we accept the main conclusions of the Harrar report and join with UNDP and the Rockefeller Foundation in the next stage of preparation of this project.

Present Status of Cotton

2. Cotton is a crop of unique importance to LDCs. Cotton lint and yarn account today for \$3 billion of exports from LDCs, making cotton the fourth largest LDC export commodity behind oil, copper and coffee. The production, processing and manufacture of cotton provide at least part of the livelihood of about 150 million people. Cotton lint accounts for more than 10% of the exports of 16 countries, eleven of which have per capita incomes under \$200, and more than 45% of the exports of the Sudan, Egypt and Chad.

3. Cotton production and the manufacture of cotton goods have expanded rapidly in LDCs. LDC cotton production has increased at an annual rate of 3.3% from 1955 to 1973. World acreage planted to cotton has not increased, so that the increase in production has been due to an increase in yield per acre. In addition, world cotton textile manufacturing capacity has been shifting in the direction of the LDCs. The share of world cotton system spinning capacity located in LDCs has increased at an average annual rate of 4.1% per year, to a 1973 level of 32%. At present, the LDCs have a 38-40% share of the world market for cotton production and 32% of the world's market for spinning. In other words, cotton today is one of the success stories of development.

4. Total world demand for cotton has grown at an average annual rate of 2.1% from 1955-73. Cotton exports from LDCs (by weight) have risen at an average annual rate of 2.5%, but total world demand for fibers has grown at an average rate of 3.9% over the same period. This means that cotton exports have expanded, but that cotton's share of the total world market for textiles has dropped from 70% to 50% (on a weight basis). We expect it to drop to 43% by 1985.

5. In summary, the growth of cotton production and of the LDC cotton industry has been impressive in the past. We must now ask ourselves whether it will continue to be so without special support for research and marketing.

Need for a Cotton Technology Research Program

6. The case for assisting in a technological research program rests on the need to preserve the long-run market position of cotton vis-a-vis artificial fibers. The experience of rubber and wool shows that a modern program of technological research can help defend the market position of a natural product against vigorous competition from synthetics. The experience of jute, on the other hand, shows how man-made fibers can take away one market after another from a natural product not backed by a strong research program.

7. The major danger facing cotton is that textile manufacturers will find it in their interest to continue to increase the proportion of their output devoted to products of man-made fibers. These manufacturers, whether in developed or in developing countries, are now without loyalty to any fiber, and will use whichever fiber offers them a lower price and/or functional characteristics suited to the market. Man-made fibers increased in costs by about 30-40% due to the increase in petroleum prices, but this increase is matched by the effect on cotton costs in many parts of the world by the increases in the costs of fertilizer, fuel, machinery and pesticides.

8. A technological program designed to preserve the long-run global market position of cotton would have to include five elements: production research; end-use research and development; technical services and marketing of new processes to manufacturers; technical assistance to LDC cotton textile industries; and marketing of new products to consumers.

9. These elements are interdependent and need to be integrated into an overall product strategy. For example, R&D needs are identified by keeping in touch with customers and manufacturers to learn of their needs and problems. A new product or process, such as permanent-press denim, must be promoted to fiber processors and textile manufacturers, who will often insist on an advertising campaign, paid for by cotton interests, to promote the new product to the public. New technological developments, such as spinning technologies indifferent to fiber length, affect the desirability and importance of different properties of the cotton fiber, thus affecting the goals of breeding programs and other aspects of production research. New understanding of the fundamental structure of the cotton fiber can make possible new technology for both processing and production, for example, the liquid ammonia swelling process, which researchers hope will be the first step towards a practical easy-care cotton.

The Harrar Report

10. A year and a half ago, we joined with UNDP and Rockefeller in asking George Harrar to organize a team to recommend for our consideration a global program of research on cotton, intended to improve or at least maintain the market position of cotton vis-a-vis man-made fibers. The program was to be integrated in the sense that it would combine the five elements listed above in a coherent strategy. The report drew upon the findings of an earlier UNDP report, and upon the experience to date of the International Institute for Cotton (IIC) and of other cotton research organizations.

11. The Harrar report was reviewed in draft by experts from developing and developed countries last July and the final version was submitted to the sponsors in September. The report was presented to the governments of the major producing countries at the meeting of the International Cotton Advisory Council in Abidjan in November 1975, and was received enthusiastically by the LDC producers.

12. The report calls for the establishment of a new International Center, which would execute a program of

a) Guidance to national centers of production research, including collection and distribution of germplasm;

b) End-use research and development, to be carried out both in-house and by subcontracting to existing centers;

c) Technical assistance to LDC cotton textile industries, through collaboration with national textile institutes to be established in LDCs with significant textile industries.

These activities would be closely linked operationally with a separately funded operation concerned with the marketing of new processes to manufacturers in developed and developing countries, and the marketing of cotton products to consumers, on the model of the International Wool Secretariat.

13. The Harrar report estimates an annual budget of about \$6 million for the total activities of the International Center. This is broken down into functions in the following table. The initial capital expenditures of the Center would probably be small - say a million dollars or less - and the budget would build up to the steady state level of \$6 million (in 1975 prices) over 2-4 years.

Approximate Functional Budget for Harrar Report Proposals

1. Facilitation of agricultural research \$ 1.25 million
2. Sophisticated end-use research for developed country markets (mostly product and process development)
 - in Manchester \$ 1.5 million
 - outside Manchester (mostly basic research) \$ 1.0 million
3. Adaptive research and Technical Assistance to LDC industry \$1.5 million
4. Technical services to developed country industry \$ 0.75 million
5. Promotion of processes and products to manufacturers (not treated in Harrar report) \$ 5.00 million
6. Promotion of products to consumers (not treated in Harrar report) \$10.00 million

14. These figures are based on the assumption that the Center will be in Manchester, England, and will be able to use the extensive library and laboratory facilities there. It may be necessary to change this location to Izmir, Turkey, or to some other place in an LDC, in order to gain political support in LDCs and in donor countries. UNDP is strongly of this view. Such a change would decrease the effectiveness of the program and increase its costs to an unknown extent, but probably significantly.

Issues Raised by the Harrar Report

15. With the submission of the Harrar report, there surfaced within the Bank long-standing disagreements regarding the priority of research on cotton vis-a-vis research on staple foodcrops, on the need for international research on cotton production, and on the probable value of industrial research intended to develop new uses for cotton. There were also significant issues outstanding as to the possible location of research activities, their relation to the International Institute for Cotton, to national cotton organizations, and to the CGIAR.

16. These issues were aired in detail in two long meetings, which I chaired, between Bank staff and the members of the Harrar team. While many issues still remain unresolved, the picture is now sufficiently clear that I think we can move forward with the main elements of the Harrar proposal.

A. Global Long-Term Priority of Cotton

17. The statistics cited at the beginning of this memo demonstrate the present importance of cotton as a source of foreign exchange and employment in LDCs. The reaction of the Regional staffs to the Harrar report showed - if there had been any doubt - that cotton is also a crop whose production is of major long-term importance to a large number of LDCs in all regions except East Asia/Pacific. Cotton production figures importantly in their development plans, on the assumption that the market for cotton will continue to be strong. Moreover, the cotton textile industry is important and growing in nearly all cotton producing countries outside of Africa, and in several non-producing East Asian countries as well.

18. In many African countries, cotton is one of the few cash crops the technology for which is accepted by farmers. In these countries, there are few alternatives to cotton as an irrigated crop, so that any increase in irrigated area inevitably means an increase in cotton production.

19. In most cotton producing LDCs, cotton production complements rather than competes with staple food crops, in the sense that each is or could be grown once a year in a regular system of double cropping. In addition to its textile uses, cotton is an important source of animal feed. It is also becoming a foodcrop in its own right. Cottonseed is a source of animal feed and vegetable oil. A new technology, under commercial testing in the U.S. and India, has made it possible to produce from cottonseed a high-protein meal fit for human consumption.

20. The contribution of cotton to employment and foreign exchange earnings gives it a global priority of the same order as that of a major foodcrop. The assurance of a continued world market for cotton in the face of competition from man-made fibers is thus a major development objective. At its latest meeting, the Technical Advisory Committee of the CGIAR recommended that cotton production research be accorded the same (top) priority as research on the major food crops.

B. Need for National and International Agricultural
(Production)Research

21. Cotton inherited a relatively strong base of production technology because of traditional support to production research from private industry and from government acting in the interest of private industry. As a result of this support, cotton research in a given LDC often compares favorably with foodcrop research in the same country. Cotton also benefits from research carried out by USDA, by state experimental stations, by pesticide and fertilizer manufacturers, and by U.S. commercial seed breeders.

22. On the other hand, cotton yields in LDCs cover a very broad range: from good or fair in a dozen or so countries to poor in all others, including such major producers as India and Pakistan. Recent average yields in LDCs range from over 800/lb/acre in Guatemala and El Salvador (compared with 900/lb/acre in irrigated areas of the U.S.) to only 140/lb/acre in India, despite a much greater potential. In many LDCs, there is an immediate need for an extension program to raise yields with presently available technology.

23. There is, in addition, a general failure of national research laboratories to put together technological packages suited to farmers. For example, in the Sudan - the quality of whose cotton research compares favorably with that of other LDCs - a small research station at Rahad, established during the course of a Bank-financed project, was able to double yields as a result of its research on water management.

24. LDC Ministries of Agriculture typically lack the capacity to plan research goals and to design priority programs to use available resources to accomplish them. Existing research programs focus mainly on varietal improvement and largely neglect problems of multidisciplinary research, insect, weed and water control, fertilizer use, cultivation practices, and seed and fiber quality and quality control. Insect control is an especially serious neglect because of the importance of resistance to insecticides and because of the importance of secondary insect species which emerge as a major problem after insecticide treatment.

25. International support to cotton production research in LDCs, once strong, has waned, because textile manufacturers in Europe have lost their loyalty to cotton as alternatives to traditional sources of cotton became available, and as political ties to former colonies weakened. The closing in 1975 of the British Cotton Research Corporation removed a major source of international support to cotton research. The French Institut de Recherches du Coton et des Textiles Exotiques (IRCT) continues to be the chief supporter of cotton research in francophone Africa, but is reducing its program in Latin America.

26. In many countries, therefore, improvement of the national cotton production research effort should be a high priority in Bank-financed projects. This objective need not interfere with the objective of improving research on foodcrops, since the amounts of money involved are relatively small, because the two could be improved simultaneously as part of a general improvement of the national agricultural research effort, and because cotton and foodcrops often complement each other in patterns of crop rotation.

27. In addition to increased emphasis on cotton production research at the national level, the Harrar report recommends a relatively modest role for international support to such research. The center recommended

by the Harrar report would not itself carry out in-house production research. It would sponsor technical assistance to national institutes by a traveling team of experts, and would coordinate national research programs and ensure that they are compatible with consumer tastes and with actual and anticipated developments in industrial technology. It would carry out an extensive training program, and would facilitate travel and exchange of germplasm and of research information. It might also fund research of global or regional importance, to be carried out on contract by one or another national research institute. These activities would account for about \$1.25 million of the \$6 million annual budget of the proposed international center.

28. The need for at least this level of international activity in cotton production research seems clear. There may, in addition, be a need for international breeding research, beginning with the systematic exchange of germplasm among the traditionally secretive national cotton laboratories in developed and developing countries, and gradually evolving into truly international research on new varieties and other common problems of water use, pest control, and fertilizer application. This issue is the subject of technical disagreement among experts, some of whom contend that all cotton production research must be location-specific, and will need to be resolved before any proposed program is presented to prospective donors.

29. Many additional institutional issues remain to be resolved concerning the proposed international function in cotton production research. These include: the relation between national centers and an international staff or center; whether international research, if there is to be any, should be carried out at a single global center or in many regional centers; and whether this research should be assimilated into the work of the CGIAR or made the responsibility of an integrated cotton research and development program, as recommended in the Harrar report.

C. Need for Industrial (End-Use) Research and Development

30. Cotton must compete on international markets against man-made fibers, whose producers support research and marketing budgets much larger than those of cotton. As a result of these programs for man-made fibers, textile manufacturers have come to expect cotton producers to pay for fiber-specific research and related activities needed to maintain cotton's long-run marketability. In fact, however, existing efforts in this area - mainly those of the International Institute for Cotton (IIC) - fall far short of what is required for the markets where the products of most LDC cottons are sold. It is clearly important to defend cotton's markets by keeping cotton up-to-date with advances in textile machinery and with changing consumer tastes and environmental regulations, and by trying to develop in cotton and cotton-rich blends the easy-care and other desirable features of man-made fibers.

31. The Harrar report recommends that the international center, which would be located in a textile manufacturing area, carry out end-use research on cotton, both in-house and by subcontracting. This would initially stress work on the development of new properties for cotton and cotton-rich blends, such as "easy-care"; compatibility of cotton with new processing systems, such as high-speed knitting and spinning; more efficient and less polluting systems for cleaning raw cotton; and compatibility of cotton processes and products with new environmental control and resource conservation legislation, such as laws covering flammability, dust and noise control, and water and energy conservation. These activities would account for about \$2.5 million of the \$6 million annual budget of the proposed International Center, and would represent a 3.6-fold increase over the present IIC budgets for end-use research and development.

32. The present level of expenditure on end-use research specifically on cotton is now so low that a substantial increase is almost surely justified on general grounds. The following table shows that the R&D budget for cotton, taken as a percentage of the value of the product, is now only 10% of the budget for wool and an estimated 4% of that for man-made fibers. Money invested in utilization research will be useful even if it only defends existing markets for cotton by developing a large number of small improvements all along the line in cotton processing and manufacture. New processes developed by the limited IIC program raise some hopes that "easy-care" cotton may be techno-economically feasible.

Research, Development and Marketing Budgets for Major Fibers*
(millions of dollars)

	<u>R,D&M</u>	<u>% of value of fiber "crop"</u>
Cotton (1975)	25	.2
(if Harrar Report implemented)	45	.4
Wool	40	2
Man-Made Fibers		5 (estimated from general chemical industry practice)

* Best estimates - real figures are proprietary
Source: International Institute for Cotton

33. On the other hand, prospective donors are likely to ask whether there are prospects for immediate breakthroughs which will have a dramatic impact on the competitiveness of cotton. The fact is that there are today no proven prospects of high returns from research on end-uses of cotton, such as existed, for example, in agricultural research on high-yielding varieties of wheat and rice at the time the CGIAR was organized. Indeed, there is some sentiment, both inside and outside the Bank, that there is no possibility of defending cotton's European and

Japanese markets from the competition of man-made fibers, because of the relative cheapness and durability of polyester fibers and polyester-rich blends.

34. It is impossible for anyone - least of all an outsider - to predict with any assurance the prospects for techno-economic success of as-yet-undeveloped improvements in cotton products and processes. The long-term prospects for any improved cotton depend in large part on consumer tastes and on future relative prices of cotton and man-made fibers in Europe and Japan. The latter depend on feedstock prices, which in turn depend on U.S. energy policies. None of these factors is easily predicted.

35. On the other hand there is reason to believe that man-made fibers need not make as quick and easy inroads in the European and Japanese markets as they did in the American markets. At the time the man-made fibers were making inroads into the U.S. market, cotton interests lost critical years trying unsuccessfully to develop a 100% cotton easy-care fabric, instead of countering with a blend fabric richer in cotton than 65:35::polyester:cotton. This history need not repeat itself in Europe and other developed country markets. First of all, cotton still has a price advantage in these markets because of polyester costs higher than those in the U.S. Secondly, there is strong consumer preference for cotton. Thirdly, washing and drying techniques are different from those commonly used in the U.S. and customers are less finicky about easy-care. Fourthly, technological advances in the intervening years have improved the prospects for the development of an easy-care cotton.

36. Still, these are clearly important issues. They need to be carefully and systematically reviewed, both in the initial planning of any cotton program and at regular intervals once it is operating. Cotton is such an important crop, and research on it is presently so underfunded, that the best course in my opinion is to get an expanded program started and to keep its goals and scope under regular, careful review by a group of independent scientists.

D. Technical Assistance and Adaptive Research on Behalf of the LDC Cotton Textile Industry

37. Very little research or technical services is directed at the emerging textile industries in LDCs, which as a result are paradoxically turning to the manufacture of products from man-made fibers, usually from imported raw materials. This has unfortunate effects on employment in LDCs because both the production of cotton and the manufacture of cotton goods are much more labor-intensive than the production of man-made fibers and the goods therefrom.

38. The major need of LDC textile industries is not for research but for technical assistance in management and technological matters. These activities are normally carried out by national textile institutes, often

with help from UNIDO. Some of these institutes do a quite creditable job; others are quite weak. They are concerned broadly with textiles, rather than specifically with cotton.

39. The Harrar report recommends that LDCs establish such institutes, on the model of the Indian Textile Industry's Research Association at Ahmadabad, to carry out technical assistance and adaptive research. It proposes that such national centers be funded by LDC governments, with appropriate international assistance through established channels; and that the International Center provide cotton-oriented assistance to such national textile institutes, and collaborate with them in projects of adaptive research especially concerned with cotton. Such activities would consume \$1.5 million of the Center's \$6 million annual budget.

40. I am quite prepared to accept the need for these functions in LDCs, as well as IIC's assertion that textile manufacturers in cotton producing countries will be receptive to information and advance regarding cotton technology. On the other hand, I would like to see a broader exploration of alternative institutional forms before we settle on the national textile institute as a general solution. For one thing, it may take considerable time to get such institutes established in the countries where they do not now exist. In the meantime, the Bank should be alert to opportunities to include such institutes - or other institutions serving similar purposes - in its industrial projects when circumstances warrant.

E. Marketing of New Cotton Products and Processes
in Developed Countries

41. Despite the growing importance of LDCs as producers and consumers of cotton, the position of cotton in world markets will for the foreseeable future be decided by its competitiveness in developed countries.

42. The experience of the International Wool Secretariat globally and of Cotton Inc. in the U.S. shows the need for the marketing of new processes to manufacturers and of new products to consumers, and for close integration of these efforts with research and development, as essential parts of a campaign to defend the market of a natural fiber.

43. Promotion of cotton products and processes will require considerably larger sums than research - say \$10-15 million - funds that very likely cannot be raised as grants from international or bilateral donors. Thus, whether or not the international center can gain grant support from development assistance agencies for research and development, there will still remain the problem of raising promotion monies from LDC cotton producers. As a comparison, the IIC at present raises with difficulty its annual budget of \$3.5 million, of which \$0.7 million goes for R&D and the rest for promotion. This means that any international research funds will have to be used as a "carrot" to elicit substantial promotional funds from LDC producers.

44. The need for contributions to support promotion was made reasonably clear to producing countries at the International Cotton Advisory Council meeting at which the Harrar report was presented. Their favorable reaction to the report may mean that they are willing to come up with promotion monies, even if they have not so far joined the IIC.

45. International agencies have never considered carefully the boundary between research, which they may wish to support, and commercial activities, which they may not. The boundary line in industrial matters may be very fine. The Bank and other concerned agencies should consider whether marketing of new processes to manufacturers might be considered an indispensable part of research and hence eligible for international financing. Promotion of new products to consumers presumably would not be so eligible.

F. Relation with Other International Bodies

(a) International Institute for Cotton (IIC)

46. The IIC is at present the only international organization concerned with utilization R&D for cotton, and the only organization outside the U.S. which effectively integrates R&D, technical services, and marketing. On the other hand, the IIC budget is far too small to meet the global problems facing cotton. Its membership still does not include many important cotton growers (e.g., Pakistan, Sudan, Egypt), its dues-paying roster is growing only slowly, and its outreach activities to LDC textile industry are very limited.

47. The simplest way to establish an umbrella organization or center of adequate scope concerned with research, technical services and marketing of cotton would be to reconstitute the IIC in a new form with enlarged funds, membership and functions. There is now reason to believe that both staff and membership would be willing to consider such a transformation.

48. If, on the other hand, the IIC does not wish to change its present structure, the international community will need to establish a parallel organization which would presumably subcontract some of its functions to IIC. It will be a rather delicate task to manage this without destroying IIC's present base of dues-paying members. The Harrar report concludes that the relationship between the new center and the IIC can only be elaborated after the center is established. However, I believe that the relationship - both technical and financial - of R&D with promotion is critical to the success of the entire undertaking, and requires prompt and careful study.

49. The Harrar report, and the 1973 UNDP report on which it was partly based, relied for their information on end-use research upon the

IIC, which is at the same time both a major source of expertise and an interested party. During the course of Bank staff work in response to the Harrar Report, we found ourselves seriously handicapped by our lack of independent, research-oriented expertise on textile technology. Indeed, this lack of independent technological advice is a major general problem in the international system outside the TAC and CGIAR. For this reason, I consider it highly desirable that an independent ad hoc advisory committee be constituted at an early stage and that any future Bank participation of this nature be backed by expertise, available to us as consultants, sufficient that we are aware of the right questions to be asked at a policy level.

(b) UNDP

50. UNDP has from the beginning played the lead role in developing proposals for global integrated research on cotton. They organized the first mission on the subject in 1972 (in response to stimulus from the IIC) and supplied most of the money and staff work for the Harrar report. (We were allowed to co-sponsor the Harrar report even though our contribution was only \$5,000.) UNDP has now hired a full-time coordinator to develop a research work program and an institutional and financial plan for submission to donors. They have invited Rockefeller and us to join them in co-sponsoring this undertaking. This budget is not yet definitely calculated, but they have indicated that a \$60,000 contribution would probably be enough to cover our share for the remainder of FY76 and FY 77.

51. I believe that we should welcome the leadership of UNDP in this undertaking. The burden of marshalling funds for new research efforts should be shared among the international community. UNDP is the most likely candidate to take on this job, and cotton is a good subject for them to begin with.

52. On the other hand, I believe that it is essential that we co-sponsor "project preparation" with UNDP if this undertaking is to be successful. We will eventually have to be able to assure donors that this undertaking is up to our standards, and the only way to do that is to exert our influence at the preparatory stages on the many issues outlined in this paper.

(c) CGIAR

53. As mentioned above, the Technical Advisory Committee of the CGIAR briefly reviewed the research situation of cotton and concluded that prima facie there was a need for more production research on cotton, and that the importance of the crop might warrant including it within the CGIAR mandate. TAC reported that it would be prepared to look into

cotton research at greater length if the CGIAR so requested. This is likely to happen.

54. The question of whether or not the CGIAR should be involved in cotton boils down to the question of whether cotton production research should be funded along with research on production of other crops, leaving end-use R&D and marketing to a separate mechanism; or whether the whole integrated cotton enterprise, from production to end-use to marketing, should be treated as a unit, either by itself or along with other industrial crops. There are arguments to be made on both sides of this question. One critical aspect is the likelihood of mobilizing additional resources for cotton research. Treating cotton research separately from the CGIAR might make it easier to tap new sources of support and hence reduce or eliminate the competition for funds between cotton and staple foodcrop research. On the other hand, if CGIAR can raise more money for cotton than could an independent effort, and if CGIAR is willing to organize and advise itself in a manner adequate to the task, there is no reason why they could not handle at least the production side. We would have to make sure that the industrial research and marketing did not get lost in the process. The best way to resolve this issue may be to canvass, informally, some of the principal donors.

(d) Consultative Group on Non-Food Agricultural Products

55. Secretary Kissinger's speech to the Seventh Special Session of the United National General Assembly proposed the creation of an umbrella organization, funded by the International Fund for Agricultural Development, to coordinate and finance technical assistance to improve the productivity and competitiveness of non-food agricultural and forestry products. Cotton is by common consent the most important of these products, and we have been told informally that one reason the U.S. proposed an umbrella organization was to de-fuse the opposition expected from U.S. cotton interests. The UNGA adopted a resolution to the effect that "with respect to the improvement of the productivity and competitiveness with synthetics of non-food agricultural and forestry products, research and technological assistance should be co-ordinated and financed through an appropriate mechanism."

56. Following up this resolution, Mr. Peterson of UNDP wrote to you on October 27 proposing that the UNDP take the lead in establishing a coordinating and financing mechanism, in association with the Bank, FAO and UNCTAD. You responded that this is appropriate and acceptable, and designated me as the contact. Your reply (letter of November 11th) pointed out that it should not be taken for granted that a single coordinating and financing mechanism was appropriate to deal with all non-food agricultural and forestry products, or indeed that all of these products should be the subject of an international initiative at this time. The proposal

for a consultative group on non-food agricultural products will be on the agenda of IPAD when this body is formed. We need not respond further now, but my inclination is to tackle the cotton problem first and separately.

Conclusions/Recommendations

57. The first question confronting the Bank is the priority of international support of research on cotton. It is clear that cotton and the cotton textile industry are important to the economic development of a number of LDCs. Cotton faces competition from synthetics backed by research and development programs which are enormous by LDC standards. Support to production and end-use research is essential if the market for cotton is not to be eroded; in the past this support has come largely from national sources, but under present circumstances it may have to become an international effort.

58. The Harrar report provides a usable blueprint for an attack on the technological problems confronting cotton. If implemented, it should contribute in the long-run to increased yields in cotton producing LDCs and to an increase in the world demand for cotton over what it would otherwise be. Many issues remain to be resolved, but I think the way is now reasonably clear to an international attack on a well-defined critical problem. Major technological breakthroughs, while they cannot be ruled out, are not likely, but a sustained effort will be necessary to maintain cotton's competitive position.

59. I would therefore recommend that the Bank inform UNDP and the Rockefeller Foundation that we agree that cotton research is a priority item for international action, that we accept the general recommendations of the Harrar report, but that we consider that many issues remain to be resolved before a viable proposal can be placed before potential donors. We therefore would be pleased to accept the UNDP's invitation to co-sponsor the preparation of work programs and of proposed institutional and financial arrangements.

60. I therefore solicit your approval of an allocation of \$25,000 from your contingency fund for FY76 - \$20,000 for our contribution to the expenses of the study for CY1976 and \$5,000 for travel and consultants to enable us to play a more active role than heretofore in steering the enterprise. The FY77 budget for CPS will include provisions for a \$40,000 contribution to the joint work plus \$10,000 for consultants.

cc: Messrs. Knapp, Bell, Chaufournier, Krieger, Please, Stern, Wapenhans,
J. Adler, Fuchs, Lejeune, Yudelman, Thigpen
Mrs. Boskey

CWeiss/rc

FEB 18 1976

ROUTING SLIP		DATE	2/17
NAME		ROOM NO.	
① MR. CHENERY ✓		E. 1239	
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FROM		ROOM NO.	EXTENSION
E. THIGPENS		D. 438	5537

OFFICE MEMORANDUM

TO: Files

DATE: February 5, 1976

FROM: Charles Weiss *W*SUBJECT: Proposed Global Integrated Research & Development Program for Cotton

Mr. Baum chaired a 4½ hour meeting January 22 to consider the recommendations for agricultural and industrial research on production and end-use of cotton, made by a team under Dr. George Harrar, former President of the Rockefeller Foundation. Attending were representatives of the six Regional Projects Staffs, the CGIAR Secretariat, the IFC Engineering Department, the Agricultural and Rural Development and Industrial Projects Departments of CPS, and the Commodities Projection and Economic Analysis Department of DPS.

The agenda for the meeting, as it was originally planned, is attached. Dr. Harrar and his chief deputy, Dr. Al Moseman, were snowbound in New York and forced to cancel out at the last minute, necessitating the deferral of agenda items 7 and 8. In their absence, the technical findings of the team on agricultural and end-use research were presented by Dr. Billy Waddle, a retired researcher from the US Department of Agriculture, and Dr. Frank Burkitt, Technical Director of the International Institute for Cotton (IIC), respectively. Drs. Waddle and Burkitt are members of the Harrar team.

Priority of Cotton to Long-Term Development

Cotton is and will continue to be an important cash crop in several countries in each region, except for East Asia/Pacific. The cotton textile industry is important and growing in nearly all cotton producing countries outside of Africa, and in several non-producing East Asian countries as well. LDC cotton production has increased at an annual rate of 3.3% from 1955 to 1973. World acreage planted to cotton has not increased, so that the increase in production has been due to an increase in yield per acre.

Cotton grows best in light soils under irrigation. The heat tolerance of the cotton plant and the non-perishability of the fiber make it the crop of choice in areas which are remote from markets or in which days can be very hot, such as the Sudan. In some countries, such as Chad and other African countries, farmers would find it very difficult to switch out of cotton even if market conditions were very unfavorable. In other LDCs, such as Mexico, farmers switch in or out of cotton each year depending on their best estimate of the profitability of cotton compared to that of other crops. In most countries, the profitability of alternative uses of farmland is sufficiently close to that of cotton production that changes in world market prices or of national agricultural policies can have an important influence on cotton acreage. This is especially true in the US, which is an efficient cotton producer but in which cotton acreage is diminishing because foodcrops are more profitable.

In the EMENA region, cotton is a major export crop and the basis for an expanding domestic industry in Egypt, Turkey and Syria. The same is true for Pakistan and India in the South Asia region. In Latin America, cotton is an important crop in Mexico, Colombia, Brazil, Peru, Nicaragua, El Salvador and Guatemala, although it does not receive high priority from the government.

Cotton is very important to many East and West African countries, and, in particular, is the principal export of Chad and the Sudan. In these countries, it is one of the few cash crops the technology for which is accepted by farmers. It is important to the development plans of these countries on the assumption that the market for cotton will continue to be strong. In some countries of East Africa, there are few alternatives to cotton as an irrigated crop, so that any increase in irrigated area inevitably means an increase in cotton production.

In almost all these countries, cotton production complements rather than competes with foodcrops, in the sense that each is or could be grown once a year in a regular system of double cropping. Cottonseed is a source of animal feed and vegetable oil. A new technology, under commercial testing in the US and India, has made it possible to produce from cottonseed a protein meal fit for human consumption.

Mr. Baum summarized the discussion by saying that cotton is clearly important enough to the economies of enough Bank member countries as to be an important subject of concern. The growth of cotton production and of the LDC cotton industry has been impressive in the past. The question for consideration was whether it would continue to be so without special support for research and marketing.

Status of and Needs for Agricultural (Production) Research at the National Level

Dr. Billy Waddle, the production research expert on the Harrar team, summarized the findings and recommendations of the report. He described national average cotton yields in Mexico, Guatemala, Nicaragua, El Salvador, Turkey and Egypt as good; those in Sudan, Brazil, Colombia and Peru as fair, and those elsewhere in LDCs as poor. The chief areas where research is needed to improve productivity are insect control, weed control, improvement of varieties, water use and conservation, seed and fiber quality and quality control, fertilizer use, and cultivation practices.

Existing research programs focus mainly on varietal improvement and largely neglect problems of multidisciplinary research and insect and water control. Insect control is an especially serious neglect because of the importance of resistance to insecticides and because of the importance of secondary insect species which emerge as a major problem after insecticide treatment. Ministries of Agriculture typically lack mechanisms to plan research goals and to design priority programs to use available resources to accomplish them.

Bank staff members supported Dr. Waddle's account, citing the general failure of national research laboratories to put together technological packages suited to farmers. In the Sudan, in particular, there is good classical research aimed at breeding varieties resistant to certain diseases, but this is not coordinated with other research. A small research station at Rahad, established during the course of a Bank-financed project, was able to double yields, as a result of its research on water management. No research on weed control is underway in the Sudan, despite the seriousness of the weed problems in that country.

Despite this, LDC cotton research compares favorably with research on food in these same countries. In many LDCs, the immediate need is for an extension program to raise yields with presently available technology. In addition, cotton benefits from research done by US private industry on seeds, fertilizers and insecticides. Some of these industries maintain field stations in LDCs. Their research, however, is directed to increasing sales and profits from a particular input rather than to providing an integrated technology package.

As textile manufacturers in Europe lost their loyalty to cotton because alternatives to traditional sources of cotton became available, and as political ties to former colonies weakened, international support to cotton production research in LDCs has waned. The closing in 1975 of the British Cotton Research Corporation has removed a major source of international support to cotton research. The French Institut de Recherches du Coton et des Textiles Exotiques (IRCT) the chief supporter of support in Iran and Latin America, is likely to reduce its program.

Summarizing the discussion, Mr. Baum remarked that national cotton production research seemed to be inadequate in many LDCs, including many which were major cotton producers. The curtailment of British and French support would further weaken the research effort in many countries. In many countries, improvement of the cotton production research effort should be a high priority in Bank-financed projects. This objective need not interfere with the objective of improving research on foodcrops, since the amounts of money involved are relatively small, because the two could be improved simultaneously as part of a general improvement of the national agricultural research effort, and because cotton and foodcrops often complement each other in patterns of crop rotation.

International Role for Production Research on Cotton

The Harrar report recommends a relatively modest role for international support to cotton production research. The center recommended by the Harrar report would not itself carry in-house production research; it would sponsor technical assistance to national institutes by a travelling team of experts. The center would coordinate national research programs and would ensure that they are compatible with consumer tastes and with actual and anticipated developments in industrial technology, would carry out an extensive training program, and would facilitate travel and exchange of germplasm and of pre-publication research information. It might also fund research of global or regional importance, to be carried out on contract by one or another national research institute.

Dr. Waddle said that he could see little role for international research on cotton production because the work was inevitably specific to each location. In response to questions as to whether there might be an analogy to the breeding programs of the international institutes funded by CGIAR, which seek to breed varieties that can be adapted by further research to widely varying conditions in different parts of the world, Dr. Waddle replied that the basic varietal research had already been carried out in the US, and that what remained was to adapt these varieties to local conditions.

Mr. Baum summarized the subsequent discussion by saying that there was general agreement that the international community needs to replace the defunct Cotton Research Corporation and the diminishing IRCT with a centrally coordinated program at least of the scope recommended by the Harrar report. Technical disagreements still remain regarding whether an international role should go further than this to include centrally managed varietal research.

End-Use Research and Development and Marketing Aimed at non-U.S. Developed Country Markets

Dr. Burkitt, Technical Director of the International Institute for Cotton (IIC) and a member of the Harrar team, summarized the report's recommendations in this area. He pointed to the need to keep cotton up-to-date with advances in textile machinery and with changing consumer tastes and environmental regulations, and to develop in cotton and cotton-rich blends the easy-care and other desirable features of man-made fibers. Mills, machinery makers and chemical suppliers no longer have loyalty to any fiber, so that cotton growers are the only ones with a commitment to cotton.

A number of speakers challenged the possibility of defending cotton's European and Japanese markets from the competition of man-made fibers, citing the relative cheapness and durability of polyester fibers and polyester-rich blends and the extent and rapidity of their penetration of the US market. LDCs which wished to export garments to developed country markets are already concentrating on the production of man-made fibers. They also questioned why internationally-sponsored research would succeed in a situation where US based research had not.

Dr. Burkitt replied that in the US the major inroads of the man-made fibers had come while cotton was still cheaper than the man-made fibers because of the desirable end-use properties of the latter. Instead of countering with a blend fabric richer in cotton than 65:35::polyester:cotton, cotton interests lost critical years trying unsuccessfully to develop a 100% cotton easy-care fabric. This history need not repeat itself in Europe and other developed country markets. First of all, cotton still has a price advantage in these markets because of polyester costs higher than those in the US. Secondly, there is strong consumer preference for cotton. Thirdly, washing and drying techniques are different from those commonly used in the US and customers are less finicky about easy-care. Fourthly, technological advances in the intervening years have improved the prospects for the development of an easy-care cotton.

In these markets, 100% cotton or cotton-rich blends with easy-care properties, such as are being developed by research and promoted by marketing sponsored by the IIC, would command a substantial market premium over polyester-rich blends. In this sense, the aims of the IIC research program are not so much market competitiveness as product differentiation.

The Harrar report and the 1973 UNDP report on which it was based relied for their information on end-use research upon the IIC, which is at the same time a major source of expertise and an interested party. For this reason, Mr. Weiss had undertaken an informal letter and telephone poll of textile technologists in the US and Europe to obtain their views on the prospects for important advances through end-use R&D on cotton.

Mr. Weiss found that technologists in North American textile mills were often of the view that sufficient work had been done on cotton and cotton-rich blends during the days when these were competing for the US market with man-made fibers, to show that further research to improve the cotton fiber were doomed to failure, because polyester-rich blends were cheaper and better. Some Bank staff were also of this view.

European technologists in general disagreed with this view, although there was some variation within their views. They credit IIC with breathing new life into what had become a stodgy field dominated by Edisonian research - empirical trials of the effects of chemicals on cloth insufficiently backed by studies of fundamental structure. While few would promise major breakthroughs, nearly all stressed the necessity for continued research and development to maintain cotton's market position.

Mr. Baum summarized the discussion by saying that money invested in utilization research would be useful even if it only defended existing markets for cotton without recouping lost markets. On the other hand, it appeared that, with respect to further research on both production and end-use, there were not proven prospects of high returns such as existed, for example, in agricultural research on high-yielding varieties of wheat and rice at the time the CGIAR was organized. This in itself did not answer whether or not an internationally funded grant program on utilization research was justified at this time. Further exploration of these issues was necessary.

Technical Assistance to LDC Textile Industry

The Harrar report stresses the need for adaptive research on cotton aimed at the needs of the LDC textile industry, and for technical assistance to those industries on the processing of cotton. The report recommended that LDCs establish national textile institutes, on the model of the Textile Industry's Research Association at Ahmadedabad, India, to carry out these functions of technical assistance and adaptive research.

Dr. Burkitt said that these national institutes, once formed, face a long process of earning the respect of the industry, first by offering testing services, then expanding into training, machinery evaluation, and adaptive research. He felt that such centers were needed in Turkey, Brazil, Colombia, Egypt and Pakistan. Bank staff representing EMENA Region agreed that there was wide scope for such institutions in their region, while that from West Africa thought there might be justification in his region for one or two institutions concerned with quality control.

Some doubts were expressed about the general effectiveness of publicly funded industrial research institutes in LDCs, and the question was raised whether there might be other ways to influence the process of technology transfer to the LDC textile industry. There is also the question whether a national textile institute would not be of more net benefit to manufacturers of man-made fibers than to cotton, since the former would be better equipped to cooperate with it. To these questions, Dr. Burkitt replied that some of the existing national textile institutes had been very effective, and that LDC manufacturers in cotton producing countries were still primarily concerned with the manufacture of cotton goods and would be especially receptive to technical assistance with cotton technology.

Mr. Baum summarized the discussion on this point by saying that there were grounds for believing that adaptive research on cotton utilization was needed to meet the needs of LDC industry, but that it was not clear which mechanisms and institutions would be best suited to develop and bring to the attention of the LDC textile industry technology oriented to the specific problems of cotton.

Cleared with Mr. Baum

Distribution:

Members of Harrar Team
Those attending meeting
Those invited to meeting
Mr. Hoffman

Attachments:

Agenda
Attendance list
Memo calling the meeting

CWeiss:jljg

AGENDA

Meeting to Consider Harrar Report on Global Integrated R&D Program for Cotton

1. Opening remarks (Mr. Baum) 10:00 - 10:15
2. Summary of Report (Dr. Moseman and Colleagues) 10:15 - 10:40
3. Long-term Priority of Cotton Production 10:40 - 11:15

How important is the long-term role of cotton production and processing in the development of the various LDCs? In particular, what is the priority of cotton vis-a-vis staple food-crops, both in the competition for agricultural land and in the competition for international research grant funding?

4. Production Research 11:15 - 11:45

What is the status of and need for production research in the various developing countries? To what extent do they benefit from research done abroad? Is there a need for an international structure to facilitate national production research on cotton in LDCs? Are significant advances likely? Is there a need for truly international research on cotton production?

5. End-Use Research and Technical Services Aimed at Protecting Developed Country Markets 11:45 - 12:30

Is such R&D necessary to defend cotton's markets in developed countries? Are there technoeconomically feasible R&D objectives that will contribute to cotton's long-term market position in developed countries? Is the Report's proposal of an International Center for utilization research a sound one? Is the program proposed in the Report and its size appropriate? If so, should the Center be in a developed or a developing country? What should be the balance between in-house and contract research? between R&D, technical services and promotion?

6. Adaptive Research and Technical Services Aimed at LDC Textile Industry

2:00 - 2:40

World textile production is steadily shifting to the LDCs. Thus not only are textiles of increasing importance to LDC economies, but LDC textile industries are markets of increasing importance to LDC cotton growers in the same or other LDCs.

This leads to the following questions: What is the role of the textile industry in the long-term development of LDCs in various regions? What is the present and likely future role of cotton in this industry? How important is it to cotton growers to maintain cotton's share of this LDC textile industry? Would cotton-oriented adaptive research and technical assistance be an important influence to induce LDC textile manufacturers to use more cotton? If so, is the national textile institute the appropriate vehicle to achieve this end?

7. Institutional Aspects

2:40 - 3:20

The Harrar report proposes an International Center to backstop and stimulate national production research and to carry out in-house and contract end-use research and technical services suited to developed and developing country manufacturers and markets. What should the relationship of such a center be, if any, with an umbrella body, such as the International Cotton Foundation proposed by the 1973 UNDP Report on Cotton? What should be its relationship with the International Institute for Cotton? With CGIAR? Should there be a Consultative Group on Non-Food Agricultural Products? What should be the role of scientific advisory committee(s)?

8. Financial Aspects

3:20 - 4:00

What is the appropriate overall size of any international effort at production and end-use research and marketing (a term used here to include such steps as technical services to industry, promotion of new products and processes to manufacturers and new products to consumers)? What should be the balance among these activities? Of these activities, which are appropriate to support from development assistance agencies? Which require support from consuming countries? Given that promotion will inevitably take the lion's share of the aggregate expenditures of any overall effort, and that this must be paid for by producing countries, what is the most likely response from producing countries to appeals for money for promotion? What is the most effective role of the international community?

ATTENDANCE AT THE MEETING ON
THE PROPOSED GLOBAL INTEGRATED RESEARCH AND DEVELOPMENT PROGRAM FOR COTTON
JANUARY 22, 1976

Warren Baum	
Billy Waddle	
Frank Burkitt	
Charles Weiss	CPS/PAS
Montague Yudelman	Agricultural and Rural Development, CPS
James Fransen	" " "
Magdi Iskander	Industrial Projects, CPS
Heinz Vergin	East Asia Projects
Jacob Lesueur	" " "
Dorris Brown	South Asia Projects
Frank Lowenstein	" " "
Eric Sicely	East Africa Projects
Francis van Gigch	West Africa Projects
Oskar Honisch	" " "
R. G. Grimshaw	" " "
Carlos Vidalon	Latin America Projects
Clive Collins	EMENA Projects
Elisabeth Daubard	" "
Elton Thigpen	EPD/CE
Kenji Takeuchi	EPD/CE
John Coulter	C.G.I.A.R. Secretariat
Peter Andrews	IFC Engineering

OFFICE MEMORANDUM

TO: Distribution

DATE: December 4, 1975

FROM: Charles Weiss *W*SUBJECT: Proposal for Integrated Global Production
and End-Use Research on Cotton

1. The meeting to discuss this proposal is now scheduled for January 22, 1976 from 10 a.m. - 12.30 p.m. in Room D860. Drs. Albert Moseman and William Waddle will present the findings of the team which wrote the proposal and answer questions and criticisms. The team was chaired by Dr. George Harrar and its work was co-sponsored by the Bank, the UNDP and the Rockefeller Foundation. There will follow a general discussion on the general long-term importance of cotton to LDCs and on whether there are needs for additional production and end-use research at a national and international level. Mr. Baum will chair the meeting.

2. Each Region is invited to send one or two representatives to this meeting. In addition to direct comments on the Harrar report, he should be able to give the Region's views regarding the following questions:

- a) What is the long-term role of cotton production and processing in the development of the principal countries of the Region?
- b) What is the state of production research relevant to the needs of the principal countries of the Region (including both indigenous research and research carried out by laboratories and private firms in other countries)? Are new efforts needed?
- c) Do you foresee long-term marketing problems for the cotton produced in your region which could be alleviated by end-use research?
- d) What is the long-term role of the indigenous cotton textile industry in the development of the Region? What are its needs for technical assistance, development, and research?

3. You have already received on November 26 background material for this meeting. (See my memo of that date.) Last summer you received for review a copy of the UNDP report whose recommendations led to the joint IBRD/UNDP/Rockefeller report. This memo replaces my memo of November 21 on the same subject.

4. Would you please let my office know who will be attending the meeting. My new extension is 6922.

Distribution

Mrs. Boskey, Messrs. Fuchs/Dewey, Lejeune, Tims/S.Singh/Thigpen,
Yudelman, Coulter, Fransen, Lowenstein
Regional Projects Department Directors

cc: Messrs. Baum
Hoffman
van der Tak

CWeiss/rc

Attachment: Edited version of the Harrar report dated
September 1975.