

55850 7-237
Distr.
LIMITED

S&T/IGCESTD/7/10
19 June 1991

Original: ENGLISH

UNITED NATIONS
ECONOMIC COMMISSION FOR AFRICA

Intergovernmental Committee of Experts for
Science and Technology Development (IGCESTD)

Seventh Meeting

Addis Ababa, Ethiopia
4 - 8 November 1991

CULTURAL PREREQUISITES AND THE ROLE OF WOMEN IN THE
APPLICATION AND DEVELOPMENT OF SCIENCE AND
TECHNOLOGY IN AFRICA

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**TRAINING WORKSHOP ON CULTURAL PREREQUISITES AND THE
ROLE OF WOMEN IN THE APPLICATION AND DEVELOPMENT OF SCIENCE
AND TECHNOLOGY IN AFRICA**

Introduction and Opening

1. The Workshop on Cultural Prerequisites and the Role of Women in the Application and Development of Science and Technology in Africa was held at the headquarters of the United Nations Economic Commission for Africa (ECA) Addis Ababa from 28 to 30 March 1990. It was opened by Dr. Peter N. Mwanza on behalf of the Executive Secretary of the ECA. In his opening statement Dr. Mwanza extended a warm welcome to the experts, the representatives of the various organizations, and the representative of the German Foundation for International Development which sponsored the workshop. He pointed out that the workshop was foreseen in the ECA Science and Technology Programme at the present juncture when the impact of science and technology in all aspects of our lives is an important and current issue. The objectives of the workshop were therefore to create an awareness on the need to consider cultural factors in the development and application of science and technology to highlight the cultural role of women in the popularization of science and technology, to promote the utilization of indigenous knowledge systems and cultural media to propagate science and technology and finally organize an African forum on culture and science and technology in preparation for a global seminar. He called for a more enlightened and comprehensive understanding of culture and not to limit it to the physical expressions normally associated with culture. It is on this wider basis that the workshop should consider how this rich cultural heritage can provide an adequate base for exploiting the traditional and new technologies in pursuit of the ongoing socio-economic development effort. He underscored the contribution of the women whose activities and traditional role in food production contributes

enormously to the welfare of the population. Finally he called for an urgent need to establish the scientific basis for many of the practices in the rural areas and establish the self-confidence among our peoples.

2. Dr. Wolfgang Gmelin, the representative of the German Foundation for International Development (DSE), also welcomed the participants to the workshop which his organization is cosponsoring at the request of the ECA. He pointed out that DSE was a specialized institution involved in the execution of development co-operation programmes of the government of the Federal Republic of Germany through advanced training programmes and exchange of experiences. Above all DSE activities focussed on rural development, general and vocational training, promotion of public administration and various health fields. He added that his organization continues to assist activities for promoting science and technology for development as a follow-up to the Vienna Programme of Action, and it is in this vein that it sponsored the workshop on the cultural prerequisites for an endogenous science and technology development in Africa. Finally, he drew attention to a number of DSE publications covering various aspects of culture and called upon the meeting to adopt a wide perspective of the issue. He called for the operationalization of the more general concepts of the issue which was long overdue, and looked forward to a satisfactory outcome through the solid groundwork already laid down by Prof. Prah.

3. Following the opening remarks, Prof. K.K. Prah, Head of the Social Science Interface Research Unit and Principal Research Scientist at the International Centre of Insect Physiology and Ecology (ICIPE), presented a statement in which he drew attention to the importance of culture both in its material presentation and the intangible cumulative products of the human experience. He underscored the need to understand this critical component of human

experience, learn from it and use it as a base to deal with the various aspects of the socio-economic crisis facing Africa. Cultures differed reflecting the differing interests and the necessities of the specific groups of people without implying superiority of one culture over the other. He cautioned against the excessive copying from other cultures which fails to differentiate their essential ingredients and their periphery elements. He underscored the critical position of women as in the perpetuation of culture through their involvement in rearing offsprings and in their various activities to sustain the livelihood of their families.

SUBSTANTIVE ISSUES

APPROACHES TO THE INTEGRATION OF MODERN SCIENCE AND TECHNOLOGY INTO TRADITIONAL AFRICAN CULTURE

4. Prof. S. Jugessur of the ECA presented this paper, stressing that, in attempts to integrate science and technology into traditional African culture, it is not only necessary to say what are to be done, but also how they can be done. Science and technology are essential for Africa, and the traditional culture which at times hampers the development and application of these tools, has to be moulded to adapt to the pressing needs of the times, for change is a necessary condition of survival.

5. Since science and technology are normally considered as foreign to Africa, it is first necessary to demystify them by bringing out the scientific basis of many African traditional practices related to food, agriculture, medicine, psychology and African culture in general. This can be done through a general process of education in the primary, secondary, tertiary, rural and urban levels, using the tools available in the surroundings. A greater use of local languages, of radio, T.V., songs, folklore and plays, all highlighting the science and technology necessary for

improving the quality of life of the people, has to be made. Girls should be encouraged to take up physical sciences, at the secondary and tertiary levels. Universities should stress on research on traditional practices and be linked to the economic sectors of the locality. Rural and urban youth science clubs have to be created where science exhibitions and activities should become a regular feature. Community centres and village councils should be set up to encourage scientific activities relevant to the needs of the local population, and food habits should try to maintain traditional foods by upgrading their shelf-life and nutrition contents in order not to depend on food aid. For all this political patronage is essential and policy makers should be encouraged to adopt scientific and technological means to solve local problems.

6. The speaker stressed the need to preserve certain intrinsic human values present in family ties, and guard against the evils of rapid environmental pollution following an enhanced exploitation of natural resources through science and technology.

7. During the debate on the paper, one participant stressed that culture should be the basis of development and recalled a UN declaration to this effect. He also emphasized the need for a balance between cultural diversity and universality and the need to be more practical when talking about culture. Conflicts between traditional and modern values, endogenous and exogenous technologies, etc. have to find an appropriate solution and cultural response in each particular context.

8. Another participant raised the question of what incentives could be used to develop science and technology and integrate it into the culture of the people. The question of self-confidence was also raised by many participants and was regarded as a prerequisite to the mastering of modern science and technology.

9. One way of developing a scientific and technological culture is to teach the children that what their parents are doing is scientific work in the sense that it is the product of accumulated experience and knowledge transmitted through the ages by their parents and grand parents.

10. As to the scientific and technological standards, there is no need for universal standards but standards adapted to the level of development and to the particular needs of each region in any case due to lack of infrastructure and the high costs involved in maintaining quality standards, certain locally produced products should aim basically at maintaining codes of hygienic practices to meet hygienic qualities required for consumer food products and not necessary follow the detailed quality standards of the industrialized countries which are mostly relative to contexts.

11. African scientific knowledge has been neglected and there is need to rediscover the true value of indigenous skills and know-how that has been devalorized by educational system in favour of exogenous science and technology.

12. One participant was of the view that there is no dichotomy between fundamental and applied research and that to some extent fundamental research is necessary. Another participant recalled that the OAU Heads of State and Government have adopted a resolution for the promotion of science and technology for development. The recommendations of the workshop could contribute to the implementation of those resolutions.

Technological Realities and African Destiny: From Adoption
of Technologies to Reappropriation of Its History

13. Dr. S. Diakite of the African Foundation for prospect and evaluation of technological choices stated that a collective

strategy within a common African project for technological development is essential for Africa's survival. At the eve of the twenty-first century, there is need for reflecting on a programme for science and technology development, with a view to reformulate existing approaches to solve the problems that plague the continent. This would enable the African society to develop at a reasonable pace and to mitigate the impacts of external pressures from super powers.

14. No African country has on its own the means to defend itself economically or politically. Common strategies could create a wide market for our goods resulting from technological development that requires the mastery of a long chain of factors. Joint action is necessary to enable Africa to reinterpret its history and to become the main actor in its development tasks. However, this ambition to develop through a common regional strategy must be in line with world development exigencies. Hence, it is necessary to have south-south co-operation at the international level in scientific technological and economic co-operative projects. For the 1990's a world project for the development of developing countries, in line with a new Lome Convention, this time on science and technology, is necessary.

15. During the debate participants agreed that promoting democracy is very important to the development of science and technology and that it should be a strong recommendation of the workshop. But democracy is difficult to achieve when half of the population is preoccupied with survival. In any case, it has to be a long process and the political leaders have to accept opposition and "counter-powers" to evaluate and criticize policies. One problem raised is that the women are marginalized from the modern technologies and from politics. A strategy is therefore needed for the promotion of women.

16. New technologies need a social and economic framework which allows change, creativity and initiative. Mentalities have to be changed and this will be a slow process for they are rooted into history. The west took hundreds of years to pass from mental systems in which man viewed himself as submitted to the whims of nature to mental systems in which he views himself as being above nature and thus capable of mastering it and transforming it to fulfill his needs. One participant did not agree with the assertion that technology was universal and that it will eventually and evenly spread over the world. Technology is not value free and values are not all universal.

The Role of Media in Diffusion of Science and Technology -
Emerging Challenges

17. Dr. Kwame Karikari of the University of Ghana, Legon introduced the topic. Science and technology affect human beings and their relationship with the external, material world. The mediation to transform the external material circumstances impinges on cultural values. That mediation occurs within given social arrangements which predetermine the ends to which that mediation is directed. Science and technology are not socially neutral agents of transforming the external material world. The advancement of science and technology in Africa involves policy choices from among varying and contending development paradigms. A policy choice would essentially advance existing conditions of life for the peoples of Africa. Another would represent a fundamental questioning of the premises upon which existing organization of society is constructed. The questions: (i) Whose science and whose technology: (ii) What development? and (iii) Development for whom? assume critical importance. These and related questions imply that the critical problem of the development of science and technology raises fundamental issues pertaining to: (a) the international order within which Africa's crises are located (b) the socio-

political arrangements and relations inside Africa within which and in response to which a path of development of science and technology is proposed. The mass media of communication serve a "societal purpose". Their role is to inculcate and defend the essential values inherent in the economic social and political agenda dominant in society. Science and technology serve a "societal purpose" to which those who control their development and uses orientate them. A communication policy choice to advance science and technology is made from various and disagreeable paradigms determined by the development paradigm to which service science and technology may be put. Any role for communication in the resolution of the problematic of development of science and technology is conditioned by the above and related questions. It is proposed that the central problematic of the development of science and technology in Africa is the relation it must have to the political and economic emancipation of the mass majority of African people. This defines the role of the media, or more broadly, the communication policy appropriate to it, one that responds to the intricate and complex agenda of democracy and African-people-oriented economic progress.

18. During the discussion one participant recalled the role of UNESCO in promoting media and a new international order in the field of information. But before world democracy can be achieved in this field, African governments will have to promote democracy in their own countries where much of the media are controlled.

19. It is recognized that radio is the most powerful means of communication available to Africa since it can reach the vast majority of the population. Newspapers are limited to people who can read and television is limited to urban areas. It is felt that the media are too externally oriented and that new initiative, from France for example in the field of television programmes, will accentuate this problem. What is needed is a comprehensive

communication policy. Finally, it was argued that the media have difficulty to relate to people. Popular programmes are those that use a language and situations that people understand and in which they can identify themselves with.

The Notion of Cultural Blockage and Some Issues of Scientific and Technological Development Concerning the African Peasantry

20. Prof. K.K. Prah presented this paper and said that social science literature has in recent years brought out that there is an impenetrable cultural wall which shields African society. This idea is a myth preserved through the agency of the African elite. Peasants are open to ideas of science and technological development in as far as these show tangible and palpable economic benefits. The degree of acceptance of technological innovations is a factor of the economic benefits that they produce.

21. Prerequisites like indigenous languages and indigenous religious and belief systems are vital cultural institutions for the facilitation of technological and scientific diffusion among peasants and wider society in Africa.

22. During the discussion, it was stated that cultures borrow heavily from one another, and there is no real pure culture. In the field of languages, foreign languages can and must be studied as a means of communication and as a means to relate to the outside world but local languages must not disappear. They must on the contrary be strengthened for they give a sense of identity, self-confidence and value of the people. The devalorization of indigenous languages has led to alienation and has accentuated the inferiority complex.

23. Language policies are needed and some myths must be destroyed. But who will do the work of integrating hundreds of thousands of

scientific and technological new terms into local languages? In any case some languages are dying and the priority should be to revitalize these languages. Development outside of one's own language is however problematic.

24. One participant gave the example of the language policy adopted in Cameroon where emphasis is put on two official languages. Language policies have huge implications. Finally one participant raised the question of the influence of religion on science and technology development. Does religion have as much influence as language? It is felt that another workshop would be needed to address these questions.

The Role of Women in the Adoption of Food
Production and Processing Technology in
Africa: Lessons from Experience

Abstract

25. Traditional people using simple agricultural implements and tools apply skills, knowledge and processes developed over centuries in the production of Africa's major staple foods. The processes employed are intensive and are in harmony with the environment. Their farming scheme affords almost complete protection against soil erosion, soil structure injury, loss of soil fertility and maximum utilization of solar energy, all of which help to deal with the intensive rainfall, alternate wetting and drying, seasonal water-logging and desiccation experienced by many tropical and sub-tropical soils.

26. Processing of the staple foods in most African countries are dominated by traditional people mainly women. They use indigenous equipment fabricated by local artisans, craftsmen, carpenters, metal-workers and blacksmiths. African women also use traditional

knowledge of food preparation to set up "bush-canteens" and they hawk ready-to-eat food products at low cost to feed urban workers.

27. The traditional agricultural food production system combined with the small-scale food processing and catering units, manage to maintain and sustain over 75 to 80% of Africa's population living in rural areas and a large proportion of workers living in urban areas. This sector thus forms the cultural base upon which the development of agro-industries should have been based on the continent.

28. The development process adopted in most African countries, however, marginalized these traditional people: their cultural knowledge, skills, capabilities and innovations were pushed aside. Too little attention was paid to the role played by farmers, women, artisans and non-scientist ordinary people in the development process and in the requisition of new technologies especially those that would be of most use in the rural majority. This policy further hindered indigenous innovations and growth as artisans and other informal sector innovators were pushed to the periphery.

29. As the economic crisis hit most African countries, small entrepreneurs and food producers sensing the supply emergency imposed by government restrictions on imports, responded by increasing production of high demand crops. Artisans and ordinary people are developing food processing equipment and organizing food processing enterprises and networks to put essential food product into millions of homes. Women are at the centre of this essential revolutionary change as they are the ones who adopt the technologies produced.

30. In most cases, women adopted technologies they can afford and those whose cost is related to the benefits. More often, what women want is just innovations that would improve upon what they

have, or what they already know how to do, so that they can do what they do better and benefit more from their own systems. This, therefore, is the point at which research and development should intervene so that women would be provided with improved technologies which they can use at their own level.

31. During the discussion, it was noted that the concept of economies of scale must be reviewed, for Dr. Kordylas has proved with her work that it is possible to compete in large markets with production on a very limited scale. The basis of development is wrong. Education and research systems are not geared to the need of the people and they are not oriented toward solving the problem of the poor. Researchers are more inclined to publish than to work with the people at the grassroots level. Infrastructure has been developed for cash crop and subsistence agriculture has been neglected. Rural farmers have been marginalized. Sometimes traditional processes are more efficient than new industrial processes and it is traditional technologies which must be improved.

32. How research can be made more effective? A more multi-disciplinary approach is needed, the "hard" scientist must collaborate with the social scientist and researchers must get out of their laboratories and work with the people who are experiencing the problems the scientists are trying to solve. Mentality must be changed. Students at university level must be given assignments in the field and must be given credit for their work. Students at secondary level must also play a role in transmitting some science and technology concepts to their parents.

33. Women have more difficulty than men in exploiting commercially an improved technology for they have less contacts with the business world, less information and less knowledge about what it means to launch a business venture. But problems and difficulties

can be overcome with hard work. Perseverance, self-confidence and risk taking.

Indigenous Knowledge Base in the Translation of
Nutritional and Medicinal Values of
Edible Plants in Western Kenya

34. Miss Monica Opole introduced this topic, stating that women's indigenous knowledge base in the translation of nutritional and medicinal values is becoming extinct. This is due to the generalization of women's issues so that historical and culturally specific issues are reviewed in a global perspective. Effects of colonization and developmental policies have contributed to the insubordination of Africans women's knowledge base. This takes place within a world of ideas, theories and cultural attitudes which rationalize gender inequality. In the recent decade, new research and approaches to "women's issues" have come up with a lot of stress on shifting views on these issues from the ideological to the theoretical framework to more practical aspects such as the use of indigenous plants aimed at increasing local food securities.

35. In Africa, the development of indigenous knowledge base has been time tested and is ecologically sound and culturally specific. In both agricultural and nomadic societies, women have amassed a lot of knowledge on indigenous systems of conservation, production and processing of edible plants, some which have medicinal values. In Kenya more than fifty edible plant species have been identified and eaten in traditional systems but are now considered as weeds in modern family systems. Subsequently many sub-topical countries in Africa face great famines and malnutritive diseases in the absence of the use of these traditional crops. Miss Opole highlighted contributing factors to the abandonment of traditional plants in both local nutrition and medicine, their indigenous usage and

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The Impact of Development on the Roles of Pastoral
Women: The Case of the Maasai of East Africa

38. Dr. Naomi Ole Kipuri introduced this issue saying that the paper examines the impact of development and accompanying technological innovations on the status of pastoral Maasai women. But since women themselves interact with other categories of people within and without their society, it is imperative to look at the larger system within which they operate in order to focus attention on the special circumstances of women's experiences.

39. The speaker described the customary gender relations that obtained between the sexes before major technological developments took place. From a consideration of women's traditional economic roles, it was suggested that despite the patrilineal descent system, women controlled the production and distribution of productive resources and this gave them significant economic autonomy.

40. The impact of colonial and past colonial intervention on the pastoral system and indirectly on the roles of women was brought out. The intervention led to expropriation of high potential land and commercialization of livestock. This trend was intensified and perpetuated in the post-colonial states and it was shown how women became marginalized as distributors of the staple food (milk) as they progressively became dependent on purchased foods and were retained as producers of alienated products. This suggests that meaningful development strategies should be sensitive to "traditional" structures in order to prevent negative developments and technological flaws.

41. During the debate, it was pointed out that technological diffusion accentuates, in certain cases, the social inequalities, particularly between men and women. Solutions to the problem are

not easy. Women must organize themselves, form associations and promote their cause. Examples are given of such associations in some countries. Politicians and governmental machineries are not very effective in promoting the interests of the women. Women must create themselves semi-industrial industries which rely on improved technologies. But they cannot become businesswomen overnight. They must go through a long education and training process.

42. Some women organizations are not effective because they have been reseparated for political purposes. An example was given of a women organization headed by the wife of the president and working in the final analysis for the political party. The influence of colonial past, the expropriation of the best land for cash crops, polygamy and the sexist bias in education were also discussed. The discussion was concluded on the idea that women must fight for their rights and their place in society. This was summarized by a quotation: "nobody has any right except those that one has been able to take and preserve".

Applied Science and Technology: Consideration of Their
Interrelationship - A Kenyan Case

43. Dr. Wanakayi K. Omoda said that technology is invested with high expectation as a means by which to bring about development. The intelligentsia attach critical importance to it as probably the major variable by which to bring about qualitatively better change in the lives of most of the needy population. The view of the relationship between applied science and technology as obtains among the intelligentsia is measurably less than valid in so far as it reduces technology to direct derivatives of scientific research. It precludes traditional technological effort which is part and parcel of the country's technological mastery and by implication, technological effort. The view of technology as applied science tends to bias research in the direction of solving specific

practical problems. This does not augur well for advancement in the domain of science. In the long run, relatively speaking, it may likely retard further technological development. The cultural forces that are inhospitable to the scientific attitude would tend to be reinforced rather than weakened. What is needed, and even popularized, is the view that the relationship between science and technology is seen as weak and measurably symbiotic. That is, advances in science are mainly dependent on the state of the art of science itself, and similarly developments in technology are mainly dependent on the state of the art of technology itself and especially old technology.

44. During the discussion, it was pointed out that the case against technology as applied science raised questions of clarifications. Science is codified and systematized knowledge which has the power of explaining certain phenomena. As such it is different from technology and technology is not always a product of science.

45. Research is not always well interpreted and sometimes the politicians have a wrong attitude toward science. They perceived it as a pass time. One of the reasons for this is that most of the politicians do not have a scientific background.

46. Science and technology in Africa are too much structurally independent. There should be a much stronger relationship and interaction between the two. African traditional knowledge and know-how have not been elevated to the rank of science. It has been transmitted through the ages, it is practiced but it is not well and thoroughly organized in a scientific manner.

Continuity and Change in african Value Systems:
Observations from Botswana

47. Dr. P.P. Molusti, in presenting his paper, considered the macro-social change factors and how they impact on traditional African culture and social institutions, and the role of women and adoption of science and technology in African societies. Apart from the macro-economic and political problems engulfing Africa today, macro-social change processes of rapid population growth, rural-urban migration, movement of the young to far away educational institutions. etc. have far reaching implications on the African social structures and value systems. In particular they lead to retention of certain traditional institutions and introduction of new ones which together combine to hinder, disadvantage and limit particularly, women's participation in development.

48. At a micro-level traditional institutions and values include "neo-polygamy" which gives the man the right of sex outside marriage but exonerates him from the responsibility of supporting those children. This leads to the rise of 'female-headed' families where heads are poor, uneducated and unskilled. A type of training, technology and assistance should be developed for these women. Education/training combined with production is working well in Botswana.

49. During the discussion, it was pointed out that African societies have been experiencing rapid and profound changes: population growth, urbanization, introduction of modern technologies, etc. But there is still a strong cultural traditional base.

50. In the end Female headed households are at a disadvantage. They are marginalized socially, and are in a vicious circle that is

very difficult to break. There is a need for government intervention to help them. But generally governments are not interested to develop the nation, and are interested in staying in power as they take care of the interests of the few who challenge this power.

51. Women must organize themselves, work with the non-governmental organizations, form brigades and co-operatives of production using local material.

52. One approach to growing vegetable in limited land is to use a bench made of cement and very little sand and fertilizer. A video film is available to demonstrate this technology. Growing different or alternative vegetable imply a change in diet and this is not always accepted by the population. In the final analysis the freedom of women rests upon their economic freedom and power.

Population, Culture and Modern Technology in Africa
Issues Relating to Family Planning

53. Dr. Mhloyi introduced her paper and said that notwithstanding other factors, both internal and external to the African continent, rapid population growth has had a negative impact on the economic growth of the continent to the extent that a larger proportion of resources in the respective countries is diverted to demographic and economic investment. In an attempt to effect a decline in growth rates family planning programmes were implemented in different countries for the past two to three decades; however, fertility has remained high in most of sub-Saharan Africa. This high fertility is consistent with the large family size preferences.

54. Couples in most African societies perceive large families as sustainable and beneficial in their respective socio-economic and

cultural context. In order to legitimize the notion of family regulation couples need to be convinced that small families enhance their well being and not some esoteric "aggregate growth rate" or "country's economy". This legitimization will partly derive from efforts geared towards the substitution of those benefits perceived as accruing from large families such as the need to maximize the surviving number of children in order to be assured of old age security and security against other risks - economic, moral or otherwise. Attempts must be made to undermine those values conducive to high fertility like preference for sons, the stigmatization of infertility and the need to extend the familiar line.

55. Indigenous educational packages must be formulated and implemented to change those cultural props to fertility, and also to teach couples that fertility is within their calculus. This package must endeavor to enlighten couples about the advantages and disadvantages of the respective modern methods thereby, dispelling rumors about them, and also build on, and improve traditional methods of fertility control.

56. During the debate which ensued it was pointed out that the development problem is one of population and the prerequisite is family planning. Although the rationality of large family can be explained and that it is not easy to break tradition, there is a need for smaller families in Africa. Traditional contraceptive methods are still widely used but they must be improved to be made more reliable and effective. The problem is that fertility is largely determined by economic conditions and that governmental approaches to family planning are not always well received. Family planning should also try to treat problem of infertility.

57. As it is demonstrated in industrialized countries, it is as difficult to increase fertility as to decrease it for fertility

rates are rooted in values and the economy. Europe has experienced both a fall in fertility and mortality rate due to the level of economic development achieved. But in Africa, the fall in the mortality rate is due to the availability of medical drugs and vaccines and other factors are present to keep the fertility rate high - for instance the desire to have a son, the pressure to get married not to be socially recognized as a prostitute, etc. One of the best means to reduce fertility rate is to promote the economic independence of the women.

Adoption of the Report and Recommendation

58. The workshop considered a draft report of its meeting prepared by the secretariat and adopted it after making suitable amendments to it. It also adopted a number of recommendations which appear in Annex II to the report.

Closure of the Meeting

59. In closing the meeting, the representatives of the sponsors expressed gratitude to the participants for their contributions to the workshop and expressed hope that they would do their utmost to see to the implementations of the recommendation of the meeting. Participants were also requested to submit their revised papers to Prof. Prah as soon as possible to facilitate the preparation of the proceedings.

Recommendations

1. Indigenous African cultures do have a scientific base which needs to be brought out through research, and popularization in order to facilitate continuity and strengthen self-confidence required for scientific and technological development.

2. In planning for science and technology development programmes, structural proximity of ethno-linguistic groupings have to be identified, researched, with a view to using such groupings as bases for the development and dissemination of scientific and technological knowledge. Existing and potential institutions have to be identified for this purpose.

3. There is need to have democratic conditions for the development and promotion of science and technology. Autonomous organizations should be created at national levels to evaluate public policy and encourage endogenous development in science and technology.

4. In developing a communications policy and strategy to advance science and technology, efforts must be made to identify, develop and use traditional forms of communications, such as folklore, drama music, etc.

5. Community managed radio and press projects which use local languages as their principal medium to educate the community, should be encouraged. Mass media should broadcast research results that aim at improving the lives of the community.

6. The introduction of science and technology has, for socio-economic factors, tended to marginalize women to the advantage of men. Governmental and non-governmental as well as bilateral and multilateral agencies should take into account historical and cultural factors of each situation to safeguard women's interests before introducing any development package, and should give priority to technologies that will lessen the burden of women and enhance their position.

7. Because Africa is facing severe population problems which hamper sustained development, indigenous educational packages on

reproductive behavior patterns and goals advantages and disadvantages of the respective methods, must be designed and implemented. Such packages must build on and develop traditional technologies of fertility regulation.

8. For modern contraceptive technology to be effectively utilized as a means of fertility regulation, a demand for such technology must be created and/or amplified. Such efforts must endeavor to identify, replace and/or discourage those factors which favour conducive to large family size preferences.

9. The ECA, UNESCO and OAU Secretariats should, in collaboration with the international and national organizations, undertake specific programmes to promote and disseminate the scientific culture among Africans, emphasizing the role of women in this field, paying more attention to the language question in making science and technology popular amongst the masses.

10. Workshops and seminars on this and related issues should be held frequently, as in the framework of the implementation of paragraph 33 of the "Addis Ababa Declaration" adopted by the Heads of State and Government on the occasion of the 25th Anniversary of the OAU in July 1988 concerning the promotion of science and technology.

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