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Pesticide Supplies and Capacity to Prevent Losses for the 1996 Cropping Season in Ethiopia

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Executive summary

The bumper crop Ethiopia harvested in 1996 (for the 1995 cropping year) may have been a gift attributable to the timely rainfall and lack of severe pest infestation in all but a few locations in Ethiopia, both of which contributed to the record expected 9.4 million metric ton cereal and pulse crop. However, the 1996 prospective crop remains in jeopardy of crop diseases, especially when susceptible crop varieties are considered. This was true in the case of *Helminthosporium* leaf blight in the South-west and on the maize variety Beletech and the two hybrids BH 140 and BH 540. Late blight of potato is often present and could be destructive if successive moist periods occur without chemical fungicides. There was no armyworm migration in 1995, although already this year there is a possibility of serious outbreaks. Also, this past year several thousand hectares in North and South Welo zones (Amhara Region) were sprayed for grasshoppers and Welo bush crickets. Desert Locusts were not severe but vigilance and spraying controlled the African migratory locust in Eritrea before they reached the Afar national Regional State and Tigray Region. Finally, credit should be given to a record effort to control quelea birds and which resulted in saving grain crops from over 62 million birds that can consume up to 10 grams each per day.

In addition to favourable weather and increased fertilizer use, careful pest control measures will be needed to repeat the crop yields of 1995. The plant health clinic system in the country has been handed over to the regional crop protection departments from central experts. This hand-over has resulted in the employment of new staff only in some cases, whereas in the majority of regions there is no budget for additional manpower. The national strategy for co-ordinating pest control is unclear and some areas may be deficient in appropriate monitoring or implementing services. Although some basic assistance from the Desert Locust Control Organisation for East Africa (DLCO-EA) exists, it too is under severe budgetary constraints. A national priority need, which should be immediately implemented, is to fully fund, staff and train those who will be responsible for control of the expected hazards and for protocol procedures necessary to stave off serious crop losses.

Pesticide use of crop protection activities of the past year

Non-migratory pests

The serious non-migratory crop hazards encountered in the 1995 crop included insect infestations in North and South Welo zones of Region 3, late blight on potato/tomato and leaf blight on maize. The Welo bush cricket (*Degeza*) and grass hopper frequently damage cereal crops of the Welo area because the dry climate with grasses and forks around the fields are inviting habitats for egg laying. Save the Children-UK has been training the Ministry of Agriculture staff in pest management and the MoA allotted some chemicals to North/South

Welo for control of these pests. Several thousand hectares were ground sprayed and the local practice of thrashing with thorn branches was employed. Chemical safety is being monitored by the National Research Institute of England and is now seen as a necessary component of integrated food security.

The late blight fungus, *Phythopthera infestans,* got its name from the blackened leaf symptoms developed late in the growing season just when the tiny potato tubers or tomato fruits formed are enlarging. Surface leaf moisture from late season rain or dew allows fungus growth to quickly defoliate plants leaving only bare stems and small tubers or fruits. Chemical sprays like Zineb must be on the leaf prior to the moisture to revert fungus germination and infection. If rainfall continues to wash off the protection, repeated application is required until tuber filling or fruit growth has matured. As genetic resistance is difficult to stabilise due to different races of the fungus, the Institute of Agricultural Research is encouraging early *belg* planting as well as spraying programmes to avoid the high moisture regimes conducive to late blight fungus formation during the *meher* season.

Leaf blight on maize, *Helminthosporium turticum*, is common throughout the world and develops during warm moist conditions. Long periods of leaf surface moisture allow fungus development and toxin production. Leaf lesions prevent carbohydrate synthesis and starch accumulation resulting in shrunken grain. however in this case stable genetic sources of resistance have been utilized to adequately control the disease. In the case of Ethiopia, use of the high yield potential variety Beletech and the hybrids BH 140 and 540 which are susceptible to leaf blight will have to be limited.

Migratory pests

Although Desert Locust did not develop this year, the related African Migratory Locust did necessitate preventative measures (Table 1). Forty crop protection staff each at Dire Dawa and Mekele received training in March, just in time for the outbreaks that occurred in early May around Dire Dawa/ Jijiga and moved north through Eritrea just touching the edge of Afar, Welo and Tigray. Several thousand litres of chemical were applied largely in Eritrea and 60 of the 100 scouts remain under deployment, 20 in Afar, 10 in Tigray, 10 around Jijiga, 10 around Dire Dawa and 10 around Dhegehabur. Scouting continues because summer, winter and spring breeding and migration depends on rainfall and vegetation, both of which are present.

The major activity within Ethiopia in 1995 concerned the quelea quelea bird populations that developed in the Weyto area of South Omo, migrated through the sorghum producing areas of Konso and Gidole, and finally expanded throughout the Rift Valley as fare north as Shewa Robit. Although grass seeds are their natural food, considerable damage occurs n sorghum and wheat. The flocks break up and eat as much as 10 grams per bird through the day, but return en mass to water sources and roost in brushy areas. Control consists of scouting the roosting sites at early dawn and dusk followed by aerial spraying of roosting birds just before darkness with Queltox, a feather-oil solvents that results in death by hypothermia. An estimated 62.2 million quelea birds were killed by spraying 3,275 litres of chemical over 1,642.5 hectares of roosting sites. Consumption of a potential 6,200 quintals/day over a 45-60 day breeding and nesting period would have seriously reduced cereal harvests, not to mention the additional damage of stem breakage caused by the weight of feeding birds.

Pesticide inventories for combating crop production hazards in 1996

The current stocks and tenders for chemicals to control both migratory and common non-migratory pests are listed (Table 2a, b and c). There is a good stock of chemicals in inventory, although a large portion is at the port waiting customs clearance and others are in central stores and are not yet allocated. The government policy is to maintain a supply of migratory pest chemicals while encouraging private importation of other agri-chemicals. One company is reported to be importing Actellic (used for the protection of harvested grain) in 5 gram packets, enough to treat one quintal of crop. This packet size is more convenient for the small farmer, although it is admittedly more expensive than the 10 kg package.

It also appears that the government is encouraging more judicious usage of pesticide inventories. During the current (1996) armyworm outbreak, regions and zones were given their allocation of pesticide and told to utilise them only on cropland that was affected beyond the economic threshold. Priority was given to farmers participating in the extension demonstration programme. Rather than handing out chemicals and sprayers to farmers and to avoid improper use in Region 5, where many development agents are yet inexperienced, spraying teams were formed to assess the need for spraying as well as to control application.

Responsible organizations and current capacity to function

The plant health clinics have been turned over to the respective regions and no system has been put in place for monitoring outbreaks and co-ordinating control operations. While the Sholla Plant Protection remains responsible for national monitoring of remote areas and co-ordinating control operations, it has no authority to direct surveillance in the regions, to assure proper forecast data collection or to manage supplies and equipment needed to combat outbreaks. It is important to delineate an interim structure or contingency plan until the regions are clear about their role and their clinics become fully operational to cover the entire nation.

Clinics are located in Zway, Awassa, Goba, Harar, Kombolcha, Mekele, Bahir Dar and Jimma. However, the Awassa clinic, which formerly served Borena as well, now has to get permission from Addis Ababa to enter areas adjacent to Sidama and areas south-west of the Jimma clinic are monitored form Awassa. The Harar clinic, which formerly served Afar, Oromiya and Somali Regions, has been claimed by Region 13 (Harar). Structurally, the clinics are now under the regulatory division of the regional agriculture bureaus. Some of the people who were sent from the centre have left and have been replaced by regional staff to eliminate some duplication. Most of the clinics have received a budget; however, it will be up to the region, and not Addis Ababa, to determine the adequacy of staff levels and operational costs.

The rational behind decentralisation was that regional mandates should make the clinics more responsive. But the nation as a whole may be threatened if any of the regions lack trained manpower, adequate budgetary capacity or willingness to share limited resources when the time comes to co-operate in controlling a national threat.

The Sholla Plant Protection Laboratory of the MoA retains the mandated for monitoring and co-ordinating at the national level but will be more involved with training and assisting the regions. There is no immediate plan to dismantle the laboratory system and they continue to provide a pool of expertise should the need arise or if any region requests assistance.

Personnel from Sholla, along with assistance from USAID's Africa Emergency Locust/Grasshopper Assistance Project, gave training t 100 regional staff in Dire Dawa (Oromiya Region), Dessie (Amhara Region) and Mekele (Tigray Region) areas. The

emergency pest management course covered biology, surveying and control of grass hoppers and locusts. USAID now has an environmental impact statement which would allow it to participate in emergency control operations and supply of chemicals. Although Ethiopian staff are now up to date on technical information, the supply of chemicals, distribution to remote areas and logistics of control operations are seriously lacking; moreover, inter-regional co-ordination system is now questionable.

About 100 armyworm pheromone traps are operating in the countryside, but their capability of forecasting an armyworm outbreak may be unreliable. Although training was given in 1995, appreciation or even possibility of reporting outbreaks is not known. Occurrence of greater than 10 moths on any one day signals an outbreak within a week. Reporting is usually monthly by mail or in person and often arrives too late to be of forecasting use. Trap operators are requested to notify the wereda the same day of an impending outbreak but often even the wereda has no phone service. Sholla plans to evaluate the capabilities of the individual regions and advise corrective measures.

Sholla is also concerned about the capability to adequately control quelea birds across the regions. Quelea is more likely to occur on a perennial basis than migratory insects but damage is not so well recognised. Since spraying is confined to aerial application at dusk, proximity to a landing strip is critical. Maintenance of local gravel runways in the Rift Valley is necessary. Sholla also plans to explore prediction of Quelea migration and damage by other grain eating birds.

The Desert Locust Control Organization - East Africa (DLCO-EA) is almost defunct since only Ethiopia, Eritrea, Kenya and potentially Tanzania have paid their dues. Past accounts have not been settled and only the most urgent activities are carried out at present. The transfer of control to the Inter-Governmental Authority on Development (IGAD) has not yet materialised. The DLCO aircraft and vehicles are badly in need of retro-fitting and spare parts. About a half million dollars is needed to:

-re-engine the aircraft and purchase spare parts
-replace/repair ground support vehicles
-support ground and air operations
-payment of terminated personnel

One aircraft is presently in Tanzania combating quelea and red locusts, which are becoming more widespread, but a second requested aircraft has thus far been denied. An operational base has been strategically established in Dire Dawa to co-ordinate the usually active eastern front where locusts, grasshoppers, quelea and armyworm can frequently be expected. Cross border surveys and information is lacking from Sudan and Somalia, except from Hargeysa (north-west Somalia). Armyworm traps in Gode and Dollo (Ethiopian Somali Region) as well as western Kenya can compensate to some extent. However, as per diem funds are not available for verification of reported outbreaks in Kenya and Tanzania, confirmation reports have not been forthcoming. Already outbreaks of armyworm in South Omo, Borena and West Hararghe zones (Oromiya Region) are being confirmed by the Ministry of Agriculture.

Conclusion

In summary, trained and knowledgeable staff exist at the national and regional level but the capacity to effectively control crop losses at the grass roots level remains questionable. Supplies of chemicals in the country for migratory pests seem adequate but are low for other crop pests and becoming less freely distributed by the government. Communication and co-ordination of pest control is now more the responsibility of the individual regions and the national strategy fro inter-regional co-operation is not well defined. Trans-national co-operation is hampered by political and civil conflict and serious deficit of funds on the part of the DLCO.

Table 1. Migration pest control operations conducted by Desert Locust Control Organization in Northern East Africa in 1995.[1]

Date	Location	Species	Area Sprayed (Hectares)	Chemicals Used(lt./kg)
February	Massawa, Er	D. Locust	-	50
March	Arafale, Er	D. Locust	200	160
March	Wachiro/ Zula	D. Locust grasshopper	1039	766
March	Southeast of Tiyo	D. Locust grasshopper	125	23
March	Tiyo/Romedo	D. Locust	200	80
March	East of Tiyo	D. Locust grasshopper	55	129
April	Semhar,Er	D. Locust	1800	-
May	Djibouti	D. Locust	3600	1800
Jan-March	Red Sea Coast, Sudan	D. Locust	1460	1170

[1] Source: Desert Locust Control Organisation. May, 1996.

Table 2. Common agro-chemical supplies, rate of use, cost/hectare and potential loss avoided.

Section a. Inventories at the wereda level but including unknown amounts of expired chemicals.

Chemical name	Stock Inventory	Malady Controlled	Application Rate	Cost per Hectare	Potential Loss Avoided	Cost/Benefit Ratio
Endosulfan	26,539 Lt					
2,4-D Herbicide	53,800 Lt	Broadleaf Weeds in Cereals				
Carboryl Insecticide	36,320 Lt					
Heptachlor	37,440 Lt	Termites in Crop Fields				
Zinc Phosphate	7,250 Kg	Rodents				
Aluminuim Phosphate	104,830 tablets	Stored Grain Insects				

Section b. Agro-chemicals tendered under agricultural development funds for 1996 (expected availability).

Chemical name	Stock Inventory	Malady Controlled	Rate of Application	Cost per Hectare	Potential crop loss	Value/ Cost Ratio
Cobox		Cotton Boll Worm				
Daconyl		Coffee Berry Disease				
Phostoxin		Stored Grain Insects				
Actellic		Stored Grain Insects				
Ridonyl	37,000 Kg					
2,4-D	856,000 Lt	Broadleaf weeds in cereals				
Ensosulfan	41,000 Lt					
Rodenticide	30,000 Kg	Rats, mice and gophers				

Section c. Agro-chemicals tendered under KR-2 funds (expected availability).

Chemical Name	Stock Inventory	Malady Controlled	Application Rate	Cost per Hectare	Loss Prevented	Value/ Cost Ratio
Fenetrithion 50% A.I.	10,000 Lt					
Chlorpyrophos	10,000 Kg					
Rogger 40% A.I.	20,000 Kg	Aphids on				
Endosulphan 35% A.I.	20,000 Lt					
Carbox	2,000 Kg					
Zineb	1,000 Kg	late blight on potato & tomato				
Phostoxin	5,000 Kg	Stored Grain Insects				
Actellic 2% A.I.	50,000 Kg	Stored Grain Insects				

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