

Introduction:

Triticale is being developed as one of the cereal crops in many parts of the world. In Kenya, triticale breeding and production research started in 1967. Results from field experiments indicate that the most productive varieties of triticale are out-yielding some varieties of wheat in wheat growing areas. Besides it is more drought resistant than wheat hence will out-yield wheat in the areas considered marginal to wheat growing.

Apart from having yield advantages over wheat, triticale grain is high in protein, especially in the essential amino acids lysine and tryptophan. This makes triticale a superior cereal for human consumption, when compared to the common ones such as wheat, rice, or maize. It would therefore make a suitable supplementary food.

Although triticale is relatively new to Kenya, some farmers have already identified it as a suitable livestock feed. If this trend is allowed to continue, more people will come to regard triticale as a livestock feed, but not as human food. There was need therefore, to popularize triticale as food for humans through trials and development of triticale recipes for various local food products.

Preliminary studies done with triticale flour in the home Economics department foods section, at Egerton College indicated that triticale flour could be used alone to prepare acceptable chapati (a flat bread) and (Maandazi) (a deep fried dough) as well as cakes and biscuits.

The Project:

The first 3 months of the project (i.e. Jan.-March 1980) were used to develop standard recipes for chapati and maandazi based on in-home methods. Consumer acceptance tests were done in various stages: first with a few staff members in the Home Economics Department and then with a larger group of College staff and later with a group of students.

Pure triticale chapati and maandazi were prepared in the foods laboratory at Egerton College using the method observed at a local canteen where most of these tasters bought these products. Tasting was done in the dining room on two different days one for staff and another for students.

Evaluation was done by answering a simple Yes/No questions and simple comments on the over-all characteristics of the products compared to those they normally ate.

Results showed that maandazi from pure Triticale flour were not different from wheat flour maandazi. As for chapati, pure triticale chapati were softer than wheat and therefore more enjoyable to eat.

As more flour became available other trials were carried out with cakes biscuits and pastries using pure triticale flour and with a lot of success.

The workshop

The results of the project were presented at a workshop which was held at the end of the project year for extension officers, administrators, researchers, seed distributors and marketing agencies. A group of 25 people fully participated in the 2-day workshop held at Egerton College on 4th and 5th August, 1981.

Besides evaluating more than 12 different products made with pure triticale flour (variety T14), the participants had a chance to learn more about triticale production, from the research sector, pricing potential, marketing facilities available, breeding aspects as well as the International scope of triticale production from Dr. Zillinsky of CIMMYT, MEXICO.

At the end of the workshop a committee was formed to work out the technicalities involving grading and pricing of triticale. The group also came up with Eight (8) major recommendations for the Ministry of Agriculture to take action. (see enclosed summary proceedings).

It was felt that the workshop was timely since harvesting of both wheat and Triticale was about to start. However, participants expressed their dissatisfaction with the millers and bakers who are known to be using triticale flour in their products without the knowledge of the consumers. Besides these people refused to attend the workshop when invited to present a paper.

On the whole the workshop was able to achieve its main objectives namely:-

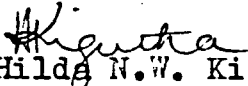
- 1). To familiarize extension workers and administrators.
- 2). To evaluate products made from triticales flour
- 3). To provide an opportunity for sharing experiences and to provide insight into the existing research information on triticales.
- 4). To discuss and recommend ways and means of increasing production of triticales and organizing a market for it.

Conclusion:

I would like to thank IDRC for providing the funds for the project. More specifically I would like to thank Miss Sally Vogel and Mr. Bruce Scott for the great encouragement without which I could not have managed.

Here at home special thanks go to the Principal, Egerton College for providing the facilities and my time from my studies to conduct the workshop.

I would also like to thank the head of home Economics Department for the support she gave me throughout the project and last but not least, special thanks go to the secretary in Home Economics Department who did all the typing work. And to all who worked hard to make the project a success, a big thank you.


Hilda N.W. Kigutha
Lecturer, Egerton College,
PROJECT LEADER.

TRITICALE RECIPESTriticale Tea Scones

2 C. triticale flour
2 Tsp. baking powder
 $\frac{1}{2}$ tsp. salt
2 tbsp. sugar
 $\frac{1}{3}$ c. firm margarine
1 egg
 $\frac{2}{3}$ c. milk.

Sift dry ingredients together and rub in margarine. until the mixture resembles fine bread crumbs. Beat the egg with milk and add to the dry ingredients. Mix with a fork until the mixture forms a ball around the fork. Turn the dough onto a lightly floured surface. Knead gently 10 times. Roll the dough with a floured rolling pin to $\frac{1}{2}$ inch thickness. Cut with a biscuit cutter. Place on an ungreased baking sheet. Bake at 425 F for 10-15 minutes or until golden brown. Serve warm with jam or marmalade.

Groundnut-Raisin Cookies

$1\frac{1}{3}$ c. margarine
1 C. brown sugar (or white sugar plus 1 tbsp. treacle).
2 eggs
1 tsp. vanilla
2 C. triticale flour
1 tsp. baking powder
 $\frac{1}{2}$ tsp. salt
 $\frac{1}{2}$ C. groundnuts (chopped)
 $\frac{1}{2}$ C. raisins

Cream margarine with sugar until light and fluffy. Add eggs and vanilla and beat well. Combine flour, baking powder, salt, nuts and raisins. Stir into the creamed mixture. Roll cookie dough into 1 inch balls and place 1 - inch apart on a greased baking sheet. Flatten cookie by pressing each ball with a fork. Bake at 350 F for 12-15 minutes or until golden brown.

Triticale Raisin Cupcakes

2 C. triticale flour
2 tsp. baking powder
 $\frac{1}{2}$ tsp. salt
 $\frac{1}{2}$ c. sugar
1 egg
 $\frac{1}{4}$ c. salad oil
1 c. milk
 $\frac{1}{2}$ c. raisins

Sift together flour, baking powder sugar and salt. Beat egg, oil and milk together. Stir liquid ingredients into the flour mixture stir to blend. Add raisins and fold in. Fill paper lined cup cake tins $\frac{2}{3}$ full. Bake at 400 F for 20 - 25 minutes.

Triticale Pancakes

2 cups triticale flour
2 tsp. baking powder
1 tsp. salt
 $\frac{1}{2}$ c. sugar
2 eggs
 $\frac{1}{2}$ cup salad oil
2 c. milk.

Sift all dry ingredients together. Beat eggs with oil and milk. Add liquid ingredients to dry ones and mix well. Heat a thick pan and drop mixture by $\frac{1}{4}$ cup fulls onto the pan. When bubbles break on the surface turn with a spatula and cook until golden brown. Serve plain or with syrup or jam.

Triticale Bread

$1\frac{1}{2}$ c. milk
 $1\frac{1}{2}$ c. water
2 tsp. sugar
2 Tbsp. dry yeast
1 tabsp. salt
 $\frac{1}{4}$ c. sugar
 $\frac{1}{4}$ c. margarine softened
4 C. triticale flour
4 C. wheat flour

Mix milk and water and warm slightly. Place $\frac{3}{4}$ cup of this mixture in a small bowl and add 2 teaspoons sugar and sprinkle with yeast. Leave to stand 10 minutes. To the remaining liquid, add salt, $\frac{1}{4}$ C. sugar, margarine and yeast mixture. Combine flours in a large bowl. Make a well in the centre and pour the liquid mixture. Stir until mixed.

Place dough on a floured surface and knead until smooth and elastic (about 10 minutes). Return dough in a large greased bowl. Cover and set in a warm place to use until double in size (1-1 $\frac{1}{2}$ hours) Knead the dough slightly and shape into 2 loaves. Place in 2 greased loaf pans, cover and let use in a warm place until double in size. Bake at 375°F for 45- 50 minutes. Brush with melted margarine and cool.

Triticale Sweet Dough

2 tsp. sugar
 $\frac{1}{2}$ C. warm water
2 T. dry yeast
 $1\frac{3}{4}$ c. milk
 $\frac{3}{4}$ c. sugar
 $\frac{3}{4}$ c. margarine softened
 $1\frac{1}{2}$ tsp. salt
2 eggs
8 C. triticale flour

Dissolve 2 teaspoons sugar in warm water sprinkle in yeast and let stand for 10 minutes. Warm the milk slightly and beat together with sugar, margarine, salt and eggs. Stir the yeast mixture into the milk mixture. Add 4 cups triticale flour and beat until smooth. Gradually add remaining flour to make a stiff dough. Place dough on a lightly floured surface and knead until smooth and elastic. Place in a large greased bowl or sufuria, cover and set in a warm place to rise to double the size. Punch dough down and use as directed for Swedish Tea Ring and cinnamon buns.

Cinnamon Buns

$\frac{2}{3}$ recipe sweet dough
 $\frac{1}{2}$ c. margarine softened
 $\frac{3}{4}$ c. brown sugar
2 teaspoons cinnamon.

Roll dough into a rectangle 20 x 10 inches on a flat surface. Spread dough with softened margarine, brown sugar and cinnamon. Roll up tightly beginning at one long side. Cut roll into slices (about inch wide) Place slices onto a greased baking pan. Cover and place in a warm place to double in size. Bake at 375° F for 25-30 minutes. Remove from pan immediately.

Swedish Tea Ring

$\frac{1}{2}$ recipe sweet dough
2 tablespoons margarine softened
 $\frac{1}{2}$ c. brown sugar
2 tsp. cinnamon
 $\frac{1}{2}$ c. raisins

Roll dough into a rectangle 15 x 9 inches on a lightly floured surface. Spread dough with margarine, brown sugar, cinnamon and raisins. Roll up tightly beginning at one long side. Place on a lightly greased pan and shape into a round ring - join ends. With scissors make cuts $\frac{2}{3}$ of the way through the ring at 1 inch intervals. Turn each section on its side. Cover and let rise to double. Bake at 375° F for 25 - 30 minutes. When cool, pour some glaze.

Triticale Maadazi

3 cups triticale flour
2 teaspoons baking powder
 $\frac{1}{2}$ teaspoon salt
2 tablespoons sugar
1- $\frac{1}{2}$ C. milk or water, warm.
Oil for deep frying

Sift together flour, salt and baking powder into a bowl. Dissolve sugar in warm milk or water. Add the liquid to the dry ingredients mixing well to make a thick but soft dough. Knead lightly (10 strokes) on a floured table. Return to the bowl and cover. Leave for 15 minutes. Roll the dough on a floured table to $\frac{1}{2}$ inch thickness. With a sharp knife cut into rectangles, triangles or squares (2"x2" or as desired). Fry in hot oil until golden brown turning once. Drain and serve warm or cold.

Variation

Add beaten egg and spices if desired.

Triti-Chapati

3 cups triticales flour
1 teaspoon salt
 $\frac{1}{2}$ cup oil or melted fat
warm water to mix

Method

1. Sift flour and salt into a bowl. Add just enough warm water to form a soft dough.
2. Put the dough onto a floured table and knead well. Put back into the bowl, cover with a damp cloth and leave to stand for 30 minutes or longer.
3. Divide the dough into balls (4-6 or as required).
4. Roll each ball thinly into a round. Brush with oil or melted fat. Fold the dough tightly with the oiled side inside and form into a ball. Repeat with the other balls.
5. Place a chapati pan on a medium heat. While heating, roll each ball thinly into a round large enough to fit the bottom of the pan.
6. Place the chapati on the hot pan and cook one side until golden brown. Turn to the other side. Brush both cooked sides with oil and keep covered in a bowl.
7. Repeat this method until all the chapatis are cooked.
8. Serve warm with a meat or vegetable stew.

TRITICALE - SPONGE CAKE

8 oz. triticales flour
4 tsp. baking powder
4 oz. margarine
4 oz. sugar
2 eggs
Pinch salt
A few drops vanilla essence
 $\frac{1}{2}$ -1 cup milk.

Method

1. Sift together flour, salt and baking powder $\frac{1}{2}$. Grease a 6 inch round baking tin or soufflé line with grease proof paper and put aside.
2. Cream margarine and sugar until light and creamy.
3. Beat the eggs lightly together with vanilla. Add to the creamed mixture alternately with flour.
4. Fold in the remaining flour and add enough milk to give a smooth flowing batter.
5. Pour the mixture into the greased tin and bake in a moderately hot oven (375° F) until golden brown and well cooked.

GROWING TRITICALE IN KENYA

INTRODUCTION

Triticale is being developed as one of the cereal crops in many parts of the world. In Kenya Triticale breeding and production research started in 1967. Results from experiments have indicated that the most productive triticales are out-yielding the most productive varieties of wheat in field tests conducted in wheat growing areas of Kenya. Triticale is resistant to drought soils than wheat. Triticale is therefore being developed to relieve wheat and other shortages since triticale will yield higher than wheat in areas considered marginal to wheat growing.

Apart from having yield advantages over wheat, triticale grain is naturally high in protein, especially the essential amino acids lysine and tryptophan. Triticale protein is well balanced. Feeding trials conducted in other countries have shown triticale to have high protein Efficiency Ratio.

<u>MATERIAL</u>	<u>PROTEIN EFFICIENCY RATION</u>
Triticale	4
Eggs	3.5-4
Milk	2.5-3
Wheat	1-2

TRITICALE VARIETIES

Two varieties of Triticale T14 and T48 are available for growing. These varieties were selected from thousands of lines, they have been tested for more than 5 years in many parts of wheat growing areas and have proved to be well adapted. Farmers growing these varieties are assured of 4- 7 tons of grain per hectare.

LAND PREPARATION

Cultural methods recommended for wheat are well adaptable for triticale growing.

- a) On stubble land, one disc harrowing followed by two to three tined harrowing before planting will produce a fine seed-bed at a relatively low cost.

- b) On newland (grass-ley or bush) seed-bed preparation should start at least six months before the scheduled date of planting. This will ensure adequate decay of plant material to produce plant food. Primary tillage using mouldboard or disc plough followed by two or three disc harrowings suitably spaced after the primary tillage operations will result in a suitable seed-bed.

SEED RATE

The usual wheat seed rate recommendation is suitable for triticales. Seed rate recommended for both varieties (T14 and T48) is 100 Kg/ha to 125 kg/ha.

FERTILIZERS

Again fertilizer rates recommended for wheat are recommended for triticales. Fertilizer recommendations are based on results obtained from experiments conducted at many locations. The difference of rates recommended depend on the previous land history. The best yields are obtained when N and P_2O_5 are applied at the rate of 40 Kg/ha.

FERTILIZER RECOMMENDATIONS

	FERTILIZER TYPE	RATE KG/HA	PLANT NUTRIENT SUPPLIED	
			N	P_2O_5
Newly broken land from grass or virgin bush	11:55:0	130	14	70
or	10:50:0	140	14	70
	8:40:0	175	14	70
	6:30:0	230	14	70
Growing triticales after one crop of wheat, maize, barley or oats	12:48:0	125	15	60
	13:52:0	115	15	60
Growing triticales after two crops of wheat, barley, maize or oats	10:30:0	165	17	50
	15:45:0	110	17	50
	12:36:0	140	17	50
	18:46:0(DAP)	105	19	50
Growing triticales after four continuous crops of wheat, barley, maize, etc.	15:30:0	165	25	50
	18:46:0(DAP)	105	19	50
	20:20:0	200	40	40

WEED, DISEASE AND INSECT CONTROL

Triticale varieties recommended have proven to be free of all diseases except in some instances mould could be found attacking triticales heads. Weed control should be about the same for wheat. Rodents are fond of triticales, they may start grazing on triticales right before heading and continue until harvest time. Triticale grain can be attacked in the stores by weevils and moths than wheat because it has softer grain than wheat. For protection and control the following are recommended:-

- 1) Admix triticales grain with blue cross, rates are usually specified on the labels.
- 2) Surface dusting the bags with red triangle dawa
- 3) Regular spraying weekly in the stores with green circle dawa dosage as labelled.

TRITICALE UTILIZATION WORKSHOP - 4TH - 5TH AUGUST, 1981

EGERTON COLLEGE - NJORO

OPENING SPEECH

By

Mr. J.K. Muthama - Director of Agriculture -

Read by Miss Grace Wagemu - Head, Home Economics & Rural
Youth Department Ministry of
Agriculture

The Principal, Egerton College
Professor R.S. Musangi

The Organisers of this Workshop

Honourable Guests

Ladies and Gentlemen,

I am here charged with responsibility of delivering the Director of Agriculture's opening speech who due to other National commitments could not come to be with you this morning. I will honourably deliver his speech and I hope I will not be reprimanded if in his absence I insert that very few people who know what Triticale is all about - and what it stands for in support of Food Policy Session Paper No.4 - which puts emphasis on Research, and New Foods or Food Improvement Programmes.

Ladies and Gentlemen, I will now proceed to read the Director's Speech.

This is indeed a great pleasure for me to have been invited by Egerton College, Department of Home Economics, to open this 2 days Workshop on Triticale Utilization. I note from your programme that the participants will be addressed by experts in this particular field covering concepts related to Triticale production, Utilization potential of Triticale in commercial and Home sectors and of great concern is the introduction already in action of triticale farming to ordinary small scale farmers in various marginal wheat areas in Kenya.

I should commend the coordination efforts between Crop Production Division of the Ministry of Agriculture, National Plant Research Centre, Njoro, Milling and Seed suppliers sectors which have contributed to reality of making Triticale a possible future wheat supplement for

Human consumption, I am glad this has been initially achieved and provoked this action oriented workshop organisers to find ways and means of developing triticale as an acceptable human food.

Triticale which as you all know belongs to wheat family, and a hybrid of wheat and Rye has rated very favourably in Kenya climatical conditions in its tested adaptability, yielding potentiality, Disease resistance, Baking and Cooking qualities. Besides these qualities, triticale is one of the man-made cereals which has received commercial acceptability in several countries Kenya included and has remarkably emerged as a suitable supplementary crop in Kenya's wheat marginal area bearing strong superiority over wheat in many aspects.

Since triticale is relatively new to Kenya, there is a need to dermine the market potential for this crop. I understand the Utilization of Triticale studies with Millers and Bakers initiated by the Ministry of Agriculture in 1978 was intended to establish a price for which the farmers can sell Triticale to National Cereals and Produce Board. I hope this workshop will come up with a hopeful agreement of encouraging this issue, to encourage farmers to sell it as a cash crop. The price if equal to that of wheat will automatically establish grade which will motivate farmers to do a good agronomy job and breeders to come up with better seed types. On Human Utilization sector, the price and grade establishment will remove the stigma currently attached to Triticale as animal feed only which would higher the efforts directed to Triticale consumption promotion as a Nutritious and tasty food. It is gratifying to know that the cookery experiments carried on triticale for home use, indicate encouraging results in terms of domestic acceptability, taste, colour and texture using locally oriented recipes. As a matter of fact Triticale flour resembles wheat flour in appearance and in texture and its products are more softer in texture and light. Its highest potential use can be expected in Commercial Sectors where it might as well be a base for wheat products already accepted and used in Kenya. But from personal observation triticale can be a potential wheat supplement in wheat marginal areas in terms of home utilization and cash generating.

This workshop has been timely convened because of our current Kenya Food situation. I am sure the department of Home Economics and experts involved in this project will help in evaluating the Utility of Triticale in various wheat - based products frequently used by Kenyan, such as bread, chapatis, maaandazi and cakes. You will see the quality of ~~products~~ prepared by Mrs. Kigutha, the Project Coordinator - Utilization factor will now be firmly established may be through the support of the International Development Research Centre which has been supporting this utilization of Triticale Project at Egerton College. This workshop then, as outlined in the project, will present the result of the project activities, covering areas of its uses in different forms and also its Nutritional value and the workshop will come up with recommendations on how best it can be used in Kenya.

I sincerely hope also, that during this workshop, the participants and experts will use triticale as a prototype situation which will make them come up with a practical approach to the reality of food situation in Kenya today. There is a dire need to explore all feasible venues which would provide us with staple - alternatives in our Kenyan changing dietary patterns created by social - economic factors and others. There is a wide field of foods in Kenya which can be improved genetically in terms of nutrients and high yield. Other indigenous cereals such as millet and ~~sorghum~~ ^{roots} crops, such as cassava, sweet potatoes, etc. legumes like soya beans and pigeon peas, these if were increased in acreage would go along way in promoting our Nutrition status of Kenyans.

It is in this context that the challenge is posed to you in Research in Extension work and in Education. Research Education or Training and Information dissemination is being given highest priority and it is only workable through team work within a programme such as this it is better to involve others with same interterests such as Kenya Industrial Research and Development Institute so that we can come up with an information dissemination package which would benefit Kenyans in New Food Utilization, Preparation, Processing, Preservation and Storage.

And with those few words I declare you 2 days Triticale Utilization Workshop Open.

Thank you.

TRITICALE UTILIZATION WORKSHOP

Place - Egerton College, Njoro, Kenya.

Date: ~~4th~~ - 3th August, 1981

PROGRAMME

2nd August 1981 - - Arrival of participants

6:30 p.m. - 8:00 p.m. - Dinner

4th August, 1981

7:00 a.m. - 8:30 a.m. - Breakfast

9:00 a.m. - 10:00 a.m. - Registration

10:00 a.m. - 10:25 a.m. - Coffee/tea break.

10:30 a.m. - 10:40 a.m. - Prof. R.S. Musangi, Principal, Egerton College to welcome guests.

10:40 a.m. - 11:10 a.m. - Opening address - Director of Agriculture.

11:10 a.m. - 11:15 a.m. - Vote of thanks - Registrar Egerton College.

11:15 a.m. - 12:00 noon - Key paper by Dr. Oggema, Director Plant Breeding Station, Njoro - "State of Triticale Research and Production potential in Kenya. Mr. M. M. Mulla

12:00 - 12:30 p.m. - Discussion: questions and answers. Senior wheat researcher officer

12:30 p.m. - 1:45 p.m. - Lunch

2:00 p.m. - 2:30 p.m. - ~~"Utilization potential of Triticale in the commercial sector"~~
2.45 pm Managing Director, National Milling Corporation. Dr. Z. Z. Z. Z.

2:30 p.m. - 3:00 p.m. - Utilization of Triticale in the household sector - Mrs. Hilda Kigutha, Lecturer - Egerton College.

3:30 p.m. - 5:00 p.m. - Demonstrations and sampling of Triticale products.

5:00 p.m. - 6:00 p.m. - Discussion over a cup of tea.

7:00 p.m. - 9:00 p.m. - Get together dinner party.

TUESDAY 5th AUGUST, 1981

- | | |
|-------------------------|---|
| 7:00 a.m. - 8:30 a.m. | - Breakfast |
| 9:00 a.m. - 9:30 a.m. | - Breeding aspects of triticales -
Mr. Nganyi - Plant Breeding Station,
Njoro. |
| 9:30 a.m. - 10:00 a.m. | - Provision of Triticales seed to farmers -
Manager, Kenya Seed Co. Ltd. |
| 10:00 a.m. - 10:30 a.m. | - Tea/Coffee break |
| 10:30 a.m. - 11:15 a.m. | - Pricing and marketing of Triticales -
Mr. J.L. Lijoodi, Chief of Planning
Division. |
| 11:15 a.m. - 11:45 a.m. | - Discussion and questions on Breeding,
availability and marketing. |
| 11:45 a.m. - 12:30 a.m. | - Group discussion and recommendations |
| 12:30 p.m. - 2:00 p.m. | - L U N C H |
| 2:00 p.m. - 3:30 p.m. | - Summary of recommendations and
workshop proceedings. |
| 3:30 p.m. - | - Closing Speech - Prof. R.S. Musangi,
Principal, Egerton College |

TRITICALE UTILIZATION WORKSHOP

SUMMARY OF PROCEEDINGS - 5TH AUGUST, 1981

79-0042
cc AFNS, ADK
Sept 1

1. BREEDING ASPECTS OF TRITICALE: By MR. NGANYI WABWOTO
from the National Plant Breeding Station, Njoro.

Mr. Wabwoto gave a brief history of triticale production and breeding in Kenya which started in 1967. Through screening and testing, five triticale varieties have been selected, T14, T48, T50, T65 and T65.

Presently there are some varieties of triticale yielding 67-72 kg. hecto-litre weight. Triticale has a higher resistance to diseases mainly stem rust especially T14 and this may have a better future than most wheat varieties. Due to this advantage over wheat, it is possible that the manpower and labour involved in growing triticale is less than that for wheat.

2. PROVISION OF TRITICAL SEED TO FARMERS

Mr. D. Gitau from the Kenya Seed Company Limited presented a short paper on this topic. For details are attached paper.

The main ideas stressed were:-

- a) There is a problem of contracting farmers to grow triticale due to lack of Government gazetted prices.
- b) The Ministry of Agriculture should come up with a policy on triticale and durum wheat in order to guide the producers (farmers) as well as the millers and consumers.
- c) A committee should be formed to make grading pricing and marketing rules. This committee should be made up of plant Breeding Station, Njoro, National Cereals and Produce Board, Kenya Seed Company Limited, Chief of Crop Production in the Ministry of Agriculture, Provincial Director of Agriculture Rift Valley and a local triticale farmer.
- d) Most of the seed produced by the Company is T65 which is early maturing and popular with the farmers.

3. PRICING AND MARKETING OF TRITICAL

This paper was presented by S.O. Okongo from Planning Division, Ministry of Agriculture. Full details are in the attached paper.

Discussion on the above paper raised the following points:-

- a) The price suggested of sh.130/bag (now sh.128/=) would discourage all the interested farmers from growing the crop.
- b) The participants expressed that pricing of triticales should take into account the higher nutritive value of triticales compared to bread wheat.
- c) It was felt that the paper had some out dated information and could be misleading in certain aspects taking into account the current research findings on triticales in Kenya and the world as a whole. It was agreed that paragraph 2 on page 5 should be crossed out.
- d) Based on the current information available from research on triticales pricing of triticales should be close or equal to that of wheat as it cannot be compared to barley or oats.
- e) Experience from using triticales flour in most laboratory kitchens and from trials at Egerton College has shown that pure triticales flour can be used for making cakes, bread, chapatis, maandazi, biscuits etc. without changing the palatability or acceptability of these products.
- f) The extension staff in the Ministry of Agriculture requested to know whether to promote triticales production or not. If they were to promote its production, then pricing, grading and marketing rules must be set up soon.

4. RECOMMENDATIONS

This workshop notes with appreciation that there is adequate research information on triticales with regard to its potential as a high quality cereal grain and its agronomic adaptability and therefore recommends that the Ministry of Agriculture takes urgent steps to promote it. It is therefore recommended the following be brought into being to promote triticales:-

- 1) Triticales should be gazetted and grading rules established in order to permit efficient production and marketing.
- 2) Triticales should be gazetted so that growers can enjoy credit facilities similar to those enjoyed by farmers growing other gazetted cereals.

- 3) That National Cereals and Produce Board be made the official Government marketing agent to handle triticales as is the case with other gazetted cereals.
- 4) That more efforts be made to dissiminate information on triticales and its utilization through all channels of extension in urban and rural areas.
- 5) That the Ministry of Agriculture (National Plant Breeding Station) prepare an illustrative map of the major expected areas of adoption of triticales (marginal areas) in Kenya. This map should include rainfall, disease pattern, altitudes soil types and yield comparison between wheat and triticales.
- 6) For the purpose of simplicity, the use of the word TRITIKELI in place of Triticales should be encouraged in Kiswahili and or vernacular literature or discussions.
- 7) That in any future publicity triticales should not be associated with animal feed as this will slow-up its adoption among consumers.
- 8) Regarding the fear that triticales could put wheat out of production, participants felt, there was no basis for this fear. There were already in existence methods of controlling out-put of triticales just as there are for any variety of bread wheat.

In pursuance of some of these recommendations, the participants proposed the following working committee to review pricing and grading of triticales.

Committee Members

- | | |
|---|---|
| 1. Provincial Director of Agriculture | - Extension Services |
| 2. National Cereals and Produce Board HQ. | - Marketing Agent |
| 3. Kenya Seed Company | - Seed Producer |
| 4. Kenya National Milling Corporation | - Representing Millers |
| 5. National Plant Breeding Station | - Njoro (Research) |
| 6. Head of Food Crops | - Ministry of Agric. Hq. - Chairman |
| 7. Head of Planning Division | - Ministry of Agriculture Hq. |
| 8. House of Manji | - Representing bakers |
| 9. Ndakaini Limited | - Triticales Grower Representing growers. |

The Committee to advise the Minister of Agriculture on price and grading of triticales within one month (6/9/81) latest) from the date of this meeting.

The participants proposed that Ministry of Agriculture (Hq), National Cereals and Produce Board (Mr. Shamala) and National Plant Breeding Station - Njoro (Mrs. Mulamula) prepare a working paper on pricing and grading of triticales respectively to be considered by the committee of 9 listed in chapter 4 (7).

In conclusion the participants noted with regret that although plans had been made by the relevant bodies and 204 hectares of triticales grown to produce about 700 tons of seed required to plant 5000 hectares in 1981/82 season, Kenya Seed Company through their own initiative had managed to receive only 86 tons. The fate of the remaining 614 tons was not known.

WORKSHOP PARTICIPANTS

79-0042

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14. E. Mugonyi	" " "	Box 27, KAKAMEGA
15. Dominic Gitau	Kenya Seed Company, Nakuru	Box 959, NAKURU
16. D.N. Mwanjila	Ministry of Agriculture HQ.	Box 30028, NAIROBI
17. H.H.A. Mulamula	Plant Breeding Station.	P.O. NJORO
18. B.A. Nganyi Wabwoto	" " "	P.O. NJORO
19. E.W. Wanjekeche	" " "	P.O. NJORO
20. K.G. Briggs(Dr)	National Plant Breeding Station	Box 2467, NAKURU
21. M. Shamala	National Cereals & Produce Board	Box 30586, NAIROBI
22. G. Kingma (Dr)	Cimmyt	Box 25171, NAIROBI
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4th August, 1981

79-0042

CC AFNS
SEPT 1

TRITICALE UTILIZATION WORKSHOP

SUMMARY OF PROCEEDINGS - 4TH AUGUST, 1981

1) OPENING ADDRESS

The workshop started at 10:30 a.m. The Principal of Egerton College Professor R.S. Musangi, welcomed the participants to Egerton College for the Workshop. He emphasised the importance of efficient production and utilization of foodstuffs as a very important issue to which the College fully recognises for betterment of the lives of the people. He extended his thanks and appreciation to the donors (IRDC) for supporting the workshop.

2) SPEECH BY THE DIRECTOR OF AGRICULTURE.

This was delivered by Miss Wagemba who is the Head of Home Economics in the Ministry of Agriculture - see the full text.

However in brief she said that triticales is a new crop whose production methods and marketing require to be streamlined. For this purpose a multidisciplinary approach or team work would yield quicker results in which research - extension and education institutions should liaise closely.

3) VOTE OF THANKS

Mr. Nguyo - the Registrar of Egerton College moved a vote of thanks to the Director of Agriculture, Plant Breeding Station, Njoro and all the participants. He stressed that the workshop was very appropriate at this time when Kenya is discussing at a very high level the issue of food policy. In addition, the Kenya Government is doing research on marginal areas and triticales is a forerunner in this area.

4) THE KEY PAPER BY THE DIRECTOR OF THE PLANT BREEDING STATION

This was given by Mr. H.H.A. Mulamula from 10:50 - 11:15 a.m. Full text see the paper attached.

Discussion of the above paper. A long discussion followed on the paper. It was agreed that the following aspects have hampered the production of triticales.

- 1) Unattractive prices and marketing arrangement relative to wheat.
- 2) Lack of grading specification
- 3) Poor promotion and support e.g. Credit facilities for production are poor and have frustrated some growers e.g. in Southern Naik where farmers are otherwise very eager to grow the crop.

Mr. Mulamula emphasized that the role of triticale is a substitute for wheat in marginal areas in which triticale is more adapted and gives higher yields in adverse dry conditions and acid soils. He recommends triticale in areas of erratic rainfall where rainfall per year is less than 600 mm (25 in) e.g. Rumuruti, lower Masai, Machakos etc.

It was observed that with increased demand of wheat at 10% -15% and current consumption of 3.6 million bags, triticale can play an increasing role to cope with deficits thereby reducing imports consequently save our foreign exchange. Dr. Zillinsky contended that bakers will trap less gas and water in triticale bread relative to wheat, but quality wise triticale will provide useful amino acids i.e. lysine, methionine and tryptophan.

Another problem to be solved is that of production technology and cooking methods. With ever increasing demand of food, these problems should be overcome in time when alternative foods will find easy acceptance. Mr. Mulamula isolated the issue of poor storability of triticale but he is confident this can be overcome through research. The need to gazette triticale to incorporate aspects of pricing marketing and general distribution was observed as a vital requirement to promote this crop. This will require top level examination and action.

(Further Action - Director - Ministry of
Agriculture.

It was the consensus of participants that triticale is very useful as an insurance against risks and uncertainties in adverse condition and against certain diseases relative to wheat, notwithstanding at this early stage attractive prices and proper marketing and distribution system is crucial to attract the cautious farmers who are often times duly conservative as regards innovations.

TRITICALE IN THE WORLD SCENE - BY DR. ZILLINSKY - CIMMYT MEXICO

The above speaker said he is in Kenya briefly partly to see how Kenya is handling the introduction of the new crop. He suggested that a pamphlet of triticale be prepared to further promote the crop.

He gave a short account of the development and genetics of triticale which is a cross of durum wheat and rye. This is a hexaploid which is consequently crossed with wheat to confer short day requirement common in the tropics. The breeding programme gave its first release called T14 which is spring material.

A lot of work has been carried out in Mexico since 1967 and the results under Research conditions have given higher yields relative to wheat and manifested that triticale bears comparable adaptations to the best wheat. On immunity scores and disease resistance scores triticale has overall exhibited superiority. Furthermore on acid soils and phosphorus deficient soils triticale has strangely been able to do better than wheat.

Initially triticale was developed for livestock feeding because of its inherent lower fibre content and higher quality reckoned to be 14% relative to wheat due to presence of amino acids, notably Lysine, Methionine and Tryptophan. It was mainly fed to pigs, poultry and cattle. However, in due course triticale has found increasing use as human food because of intrinsic protein value. In Northern America integrated flour of wheat and triticale commands about 25% higher price relative to wheat flour. The triticale products especially cookies breaks without tenacity which is a desirable factor for consumers.
