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Better Farming Series 45 - Multinutrient Block Handbook (FAO, 1995, 28 p.)



(introduction...)



Preface



Acknowledgements



What are multinutrient blocks?



Animals that can be fed
multinutrient blocks



How to make multinutrient blocks











(introduction...)



Collecting what we need

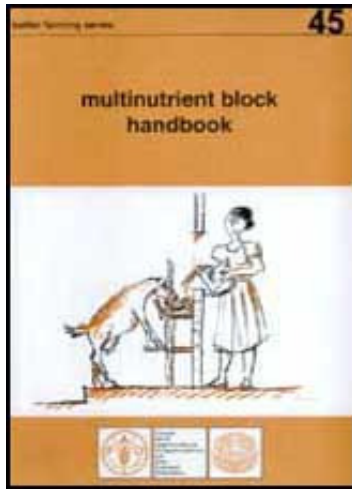


Preparing the ingredients

-  Making a trial multinutrient block
-  Making the multinutrient blocks
-  Using soft and broken multinutrient blocks
-  Feeding multinutrient blocks to animals
 -  (*introduction...*)
 -  Building multinutrient block feeders
 -  How to calculate the number of multinutrient blocks to make
 -  Using a mixer to make multinutrient blocks



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Feeding multinutrient blocks to
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Using a mixer to make multinutrient
blocks

by **L.O. Garca** and **J.I.R. Restrepo**

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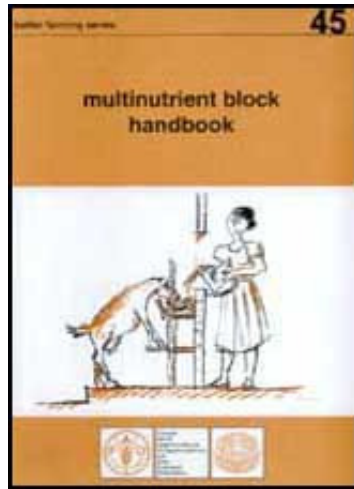


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What are multinutrient blocks?





- Animals that can be fed
- ☐ multinutrient blocks
- ☐ How to make multinutrient blocks
- ☐ Feeding multinutrient blocks to animals
- ☐ Using a mixer to make multinutrient blocks

Preface

The first 26 volumes in FAO's Better Farming Series were based on the Cours d'apprentissage agricole prepared in Cote d'Ivoire by the Institut africain de developpement economique et social for use by extension workers. Later volumes, beginning with No. 27, have been prepared by FAO for use in agricultural development at the farm and family level. The

approach has deliberately been a general one, the intention being to create a basic model that can be modified or expanded according to local conditions of agriculture.

Many of the booklets deal with specific crops and techniques, while others are intended to give farmers more general information that can help them to understand why they do what they do, so that they will be able to do it better.

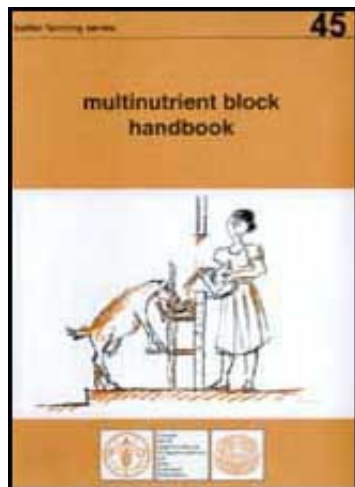
Adaptations of the series, or individual volumes in it, have been published in Amharic, Arabic, Armenian, Bengali, Creole, Ewe, Gipende, Hindi, Igala, Indonesian, Kiswahili, Malagasy, Malaysian, Nepali, Oriya, SiSwati, Thai, Tschiluba, Turkish, Urdu and Vietnamese.

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-  How to make multinutrient blocks
-  Feeding multinutrient blocks to animals
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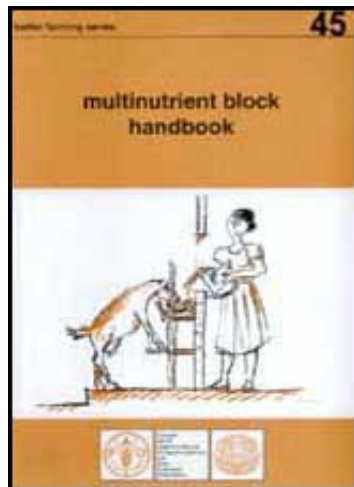
To CIPAV and staff members T.R. Preston and E. Murgueitio for their research work.

To the scientists R. Leng and R. Sansoucy for their advice and research on multinutrient blocks.

This booklet was written and designed by L.O. Garcia and J.I. Restrepo R. with educational assistance from M.E. Carvajal de Guerrero of Carvajal Foundation, Cali, Colombia.



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How to make multinutrient blocks



Feeding multinutrient blocks to
animals

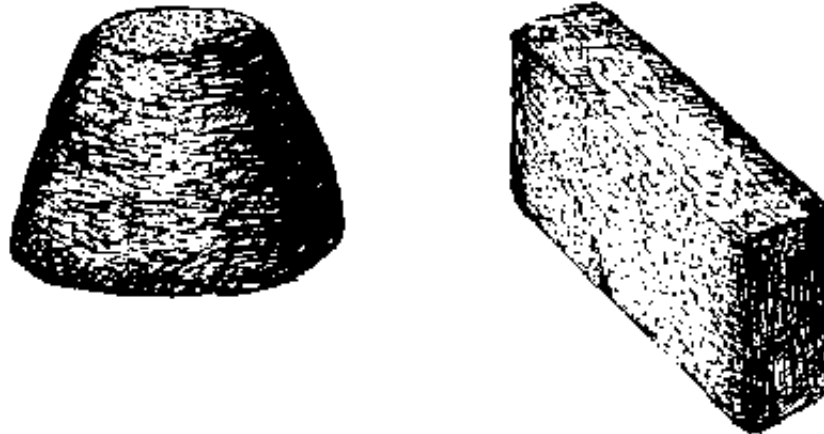


Using a mixer to make multinutrient

blocks

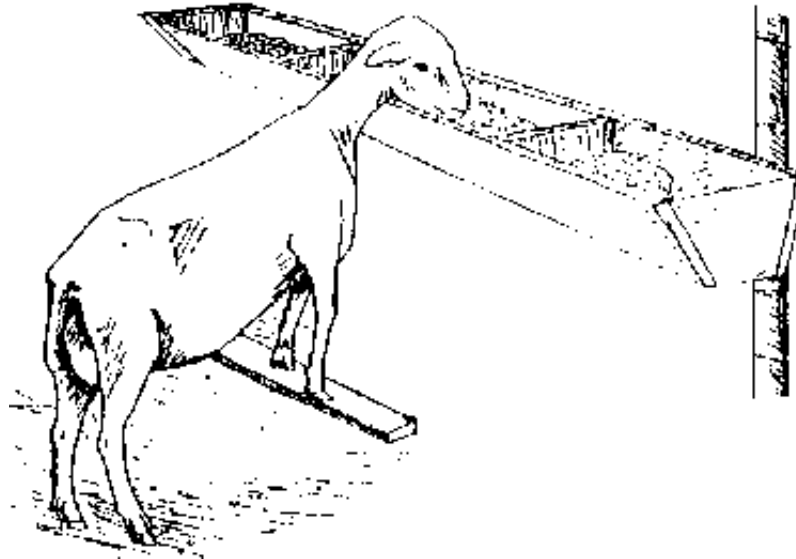
What are multinutrient blocks?

1. Multinutrient blocks are supplements for ruminants (goats, sheep, cattle and buffaloes) which contain energy, urea, essential minerals and vitamins.



Minerals

2. Multinutrient blocks have been developed for housed ruminants or animals grazing on low- quality pastures.
3. Multinutrient blocks provide minerals, vitamins, energy and urea to ruminants.

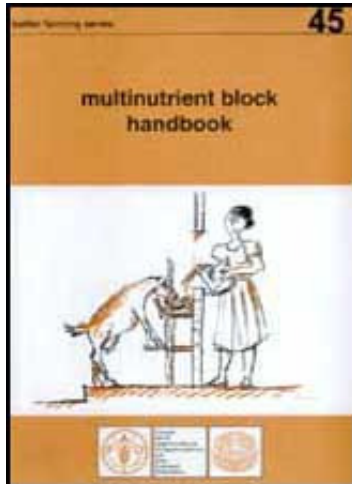


Ruminant

4. Multinutrient blocks are needed when animals are fed low-quality forages or when animals are kept in barns or stables.



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Preface



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- How to make multinutrient blocks
- Feeding multinutrient blocks to animals
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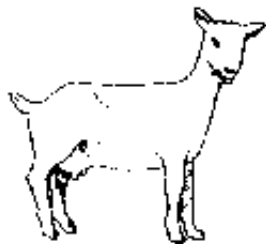
Animals that can be fed multinutrient blocks

5. Only these animals can be fed multinutrient blocks: cattle; goats; buffaloes; sheep.

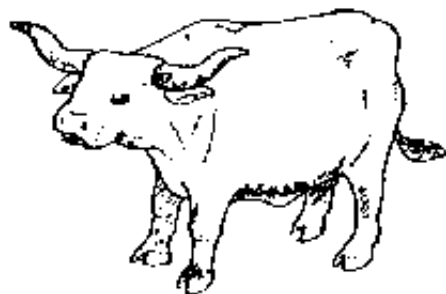
cattle;



goats;

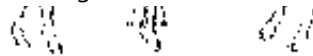


buffaloes;



sheep.

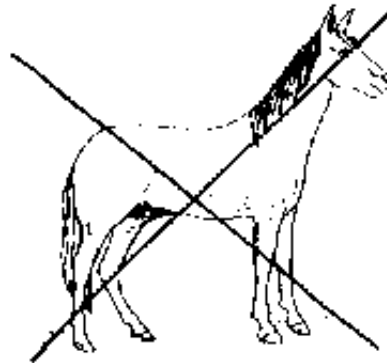




Cattle; goats; buffaloes; sheep

6. On the other hand, these animals should not be fed multinutrient blocks: horses; pigs; fish; birds; rabbits.

horses;



pigs;

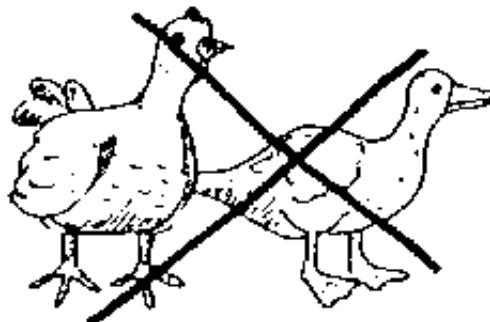




fish;



birds;



rabbits.

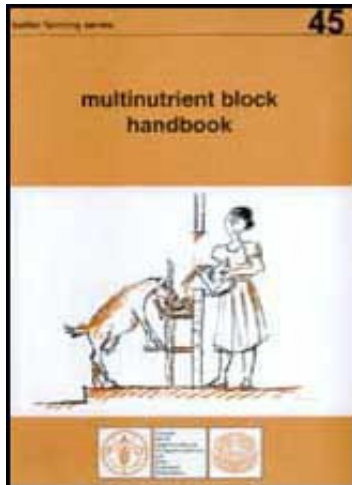




Horses; pigs; fish; birds; rabbits



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How to make multinutrient blocks



(introduction...)



Collecting what we need



Preparing the ingredients



Making a trial multinutrient block



Making the multinutrient blocks



Using soft and broken

multinutrient blocks

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How to make multinutrient blocks

7. To make multinutrient blocks we need to go through the following steps.

8. Collect what we need:

- moulds
- ingredients;
- mixing equipment;
- weighing scales.

9. Collect the following ingredients:

- sugar cane molasses;
- urea;
- salt;
- lime;
- cement;
- fibre;
- bonemeal.

10. Make a test block.

11. Mix all the ingredients.

12. Pour the mixture into the moulds.

Collecting what we need

Moulds

13. As moulds we can use: polypropylene sacks; buckets;

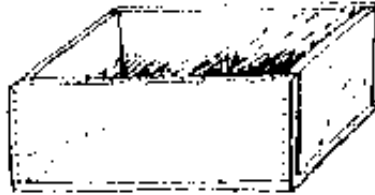
wooden boxes.



Polypropylene sacks



wooden boxes.



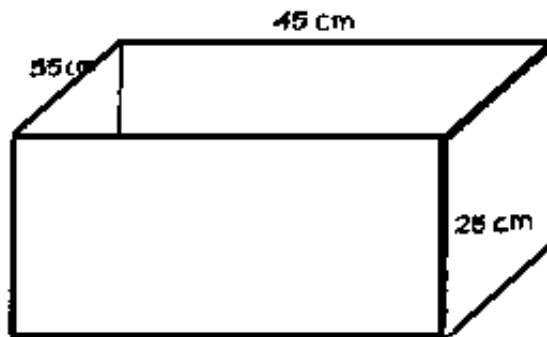
Polypropylene sacks

14. Polypropylene sacks have many advantages:

- They are inexpensive.
- They are easy to get.
- They can be used to store the multinutrient blocks.

15. Buckets can be used to make 10 to 12 kg blocks and can be made of wood, metal or plastic.

16. Wooden boxes are used to make blocks of 25 kg and up.



Wooden boxes

17. Moulds need to be lined with a plastic or paper liner to prevent the blocks from sticking to the wall of the mould.

Mixing equipment

18. As mixing equipment we can use: a shovel; a feeding trough or canoe; a spring scale.

a shovel;



a feeding trough or canoe;



a spring scale.





A shovel; a feeding trough or canoe; a spring scale

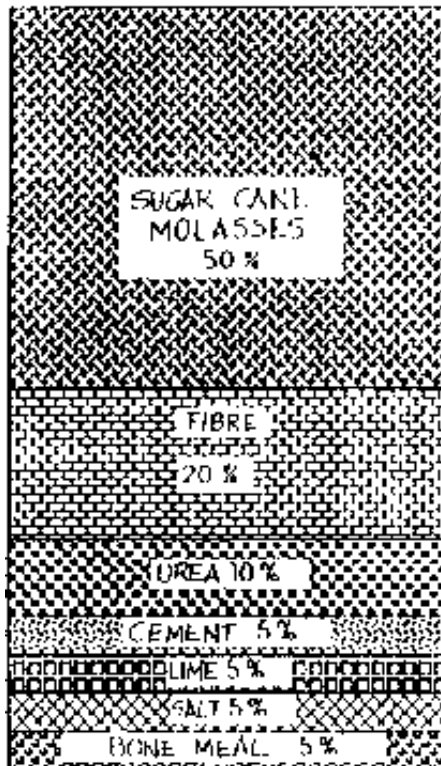
Preparing the ingredients

19. The ingredients should be mixed in the following proportions.

Sugar cane molasses	50 percent
Fibre	20 percent
Urea	10 percent
Cement	5 percent
Lime	5 percent
Salt	5 percent

Bonemeal

5 percent



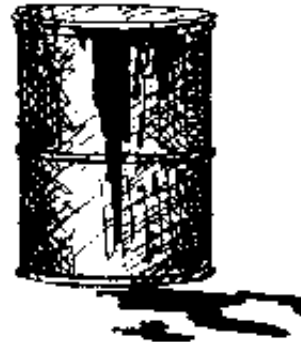
The ingredients

20. To make eight blocks of 10 kg each we need: 8 kg urea;
40 kg sugar cane molasses; 4 kg cement; 4 kg lime; 16 kg
fibre; 4 kg salt; 4 kg bonemeal.

8 kg urea;



40 kg sugar cane molasses;



4 kg cement;



8 kg urea; 40 kg sugar cane molasses; 4 kg cement

4 kg lime;



16 kg fibre;



4 kg salt;





4 kg bonemeal.



4 kg lime; 16 kg fibre; 4 kg salt; 4 kg bonemeal

Sugar cane molasses

21. Very important! Never add water to sugar cane molasses.
It has to be thick. .

22. To check if the molasses is good, dip a spoon into it.

If the molasses stays on the spoon, it is good molasses.



Good molasses

But, if the sugar cane molasses runs off the spoon and leaves it clean, it is bad molasses.



Bad molasses

Urea

23. Urea is also used as a crop fertilizer.

24. Warning! Lumps of urea need to be broken up because if animals eat an entire lump they will get sick or even die.

Salt

25. Mineral salt is better than common salt. But, if we cannot get mineral salt, we can use common salt. Common salt is inexpensive.

Lime

26. It is better to use dolomitic lime. Dolomitic lime can be found as stones or ground. Dolomitic lime gets hot when water is added.



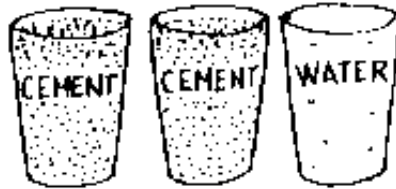
Dolomitic lime

27. Calcium carbonate is not as good as dolomitic lime, but it can also be used.

Cement

28. We use the same cement as is used in building construction.

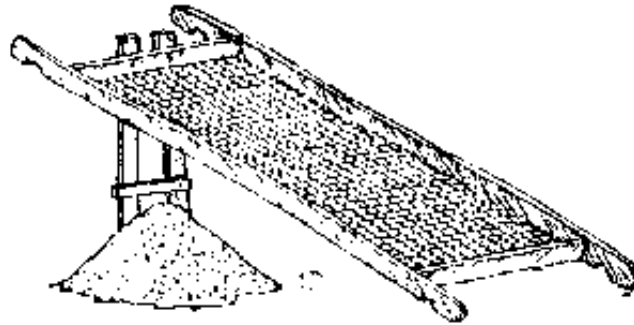
Before using cement, it needs to be mixed with water in the ratio of two parts cement to one part water.



Mixing components

Fibre

29. Fibre is very important because it absorbs water and binds the block together.



Fibre

30. The best sources of fibre are dry leaves from forage trees. Cottonseed hulls and sugar cane bagasse are other good fibre sources.

31. Chopped hay or chopped rice straws can also be used.

32. Other sources of fibre are:

- wheat bran;
- chopped hay;
- soybean hulls;
- cottonseed hulls;
- coffee bean bran;
- chopped maize cobs;
- chopped rice straws.

Warning! Rice hulls are not good for making multinutrient blocks.

33. Before using fibre it must be chopped into small pieces, dried and passed through a 1- to 2- cm screen.

Bonemeal

34. Bonemeal is an ingredient used to make balanced animal feeds. It can be purchased in an animal feed store.

Bonemeal can be replaced by dicalcium phosphate.



dicalcium phosphate

35. Dicalcium phosphate is a mineral source extracted from phosphoric rock. It can be purchased in an animal feed store.

36. If we cannot get bonemeal or dicalcium phosphate, we can replace them with mineral salt.

37. If we are not using bonemeal or dicalcium phosphate, it is better to replace common salt with mineral salt too.

38. Never use phosphoric rock, it is toxic.

Making a trial multinutrient block

39. Before making the whole batch of mix, we should make a trial multinutrient block.

40. To make the trial block add together:

- 5 kg sugar cane molasses;

- 1 kg urea;
- 500 g cement with 0.25 litre (250 g) water;
- 500 g dolomitic lime;
- 500 g common salt;
- 330 g (one- third kg) bonemeal
- 2 kg fibre.

41. Then, stir and knead all the ingredients until they look evenly mixed.

42. Last, pour the mixture into moulds and leave it for a day to let the multinutrient blocks harden.

43. Take the blocks out of the moulds and check them.



Mould

44. A multinutrient block is good when:

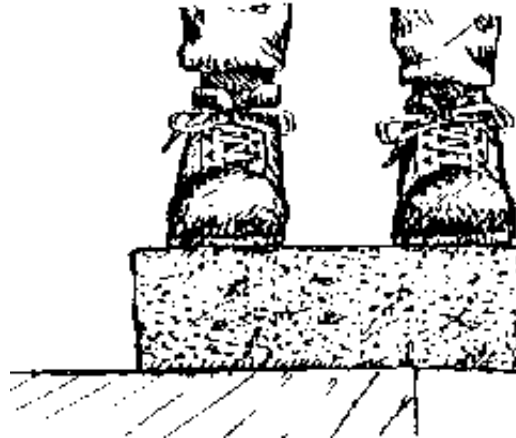
- The ingredients are very well- distributed throughout the block.
- It does not have lumps of urea and lime.
- It is hard.
- It is resistant.
- It is sticky.

45. Blocks should be too hard to squash between our fingers.



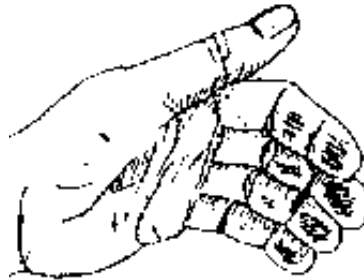
Bloks

6. Blocks should be resistant enough not to break when a person steps on them.



Bloks

47. When we hold a block, our hands should feel the sticky sugar cane molasses.



Bloks

48. Attention! When the blocks do not feel sticky, we need to increase the amount of molasses we put into the mixture.

Making the multinutrient blocks

49. Now that we have experience, we can make a bigger

mixture of multinutrient block.

50. Weigh and prepare the ingredients:

- 40 kg sugar cane molasses;
- 8 kg urea;
- 4 kg cement;
- 4 kg dolomitic lime;
- 4 kg common salt;
- 4 kg bonemeal;
- 16 kg fibre.



Weigh and prepare the ingredients

51. Very important! We have to break up lumps of urea, lime and salt.

Cement should be mixed with water; two parts of cement with one part of water.

52. Put the sugar cane molasses and urea into a feeding

trough.

53. Stir them with a shovel until they look evenly mixed.



Stiring

54. Then add:

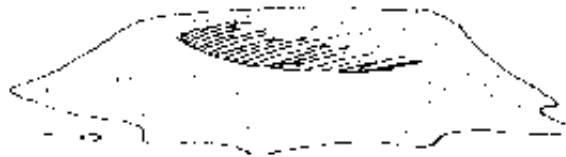
- salt;
- cement;
- dolomitic lime;
- bonemeal.

Keep mixing.

55. If the mixture becomes hot, do not worry, it means that it is being well mixed.

56. Look out! If the testing block was too hard, we need to decrease the proportion of cement in the mixture. If the testing block was too soft, we need to increase the amount of cement.

57. Pour the fibre onto a concrete floor, making a pile with a hole in the middle that resembles a volcano.



Fibre

58 Pour the mixture little by little from the feeding trough into the hole in the middle of the pile of fibre. Then start to mix

with a shovel.

59. Keep on mixing until the mixture is even and without lumps.

60. Pour the complete multinutrient block mixture into the moulds.

61. Remember! Moulds should be lined with a plastic or paper liner to prevent the mixture from sticking to the wall of the mould.



Remember

62. Store the multinutrient blocks under cover in a dry place.

Leave the multinutrient blocks to dry out for a day.

63. The next day take the blocks out of the moulds.

64. It's easy! Turn the moulds over and knock the bottom and

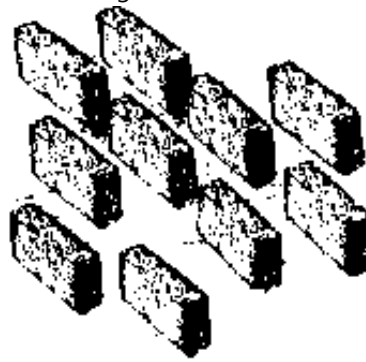
the sides.



Easy

65. If the paper sticks to the blocks, it does not matter. Animals will eat the paper without any problem. But, if we used a plastic instead of a paper liner, we need to remove the plastic from the blocks before feeding the blocks to animals.

66. Both small blocks (10 to 12 kg) and big blocks (20 kg and more) can be taken out from the moulds after a day.



Men

Store big blocks under cover in a dry place until they become hard.

67. To store blocks, we put them into individual plastic bags. If we used polypropylene sacks as moulds, we do not need to take the blocks out of the sacks. We can leave the blocks in the sacks instead of putting them into individual plastic bags.

68. Before storing multinutrient blocks, check them to make sure that they were well made.



Multinutrient blocks

69. Remember! Well- made blocks are:

- smooth and even;
- hard;
- resistant;
- sticky.

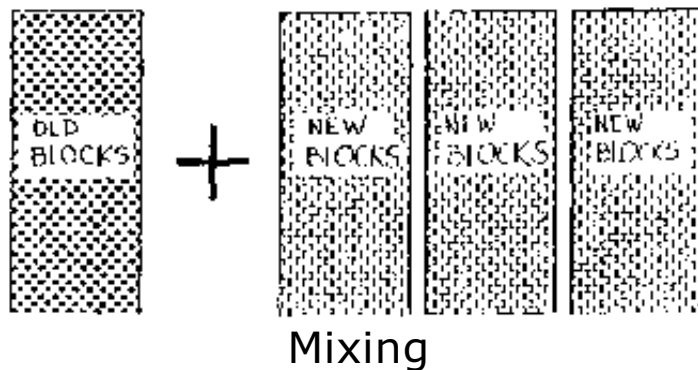
Using soft and broken multinutrient blocks

70. How can we use broken and soft multinutrient blocks? It's

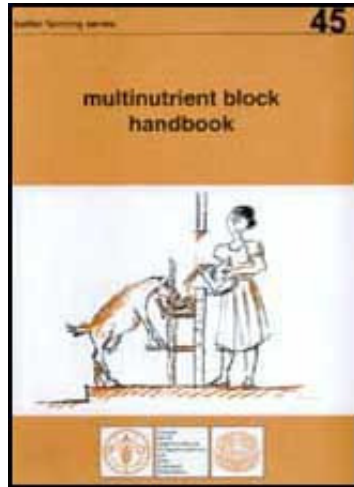
easy!

71. Take the blocks out of the plastic bags and leave them to dry for a few days.

72. Then, break and grind the blocks and mix them with new mixture to make more multinutrient blocks.



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Feeding multinutrient blocks to animals



(introduction...)



Building multinutrient block
feeders



How to calculate the number of
multinutrient blocks to make

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Feeding multinutrient blocks to animals

73. Multinutrient blocks are needed especially during the dry

season or when animals are grazing on low- quality pastures.

74. Animals can also eat multinutrient blocks during any season of the year.

75. Multinutrient blocks can be fed to cattle in:

- salting places;
- feeding troughs;
- multinutrient block feeders.

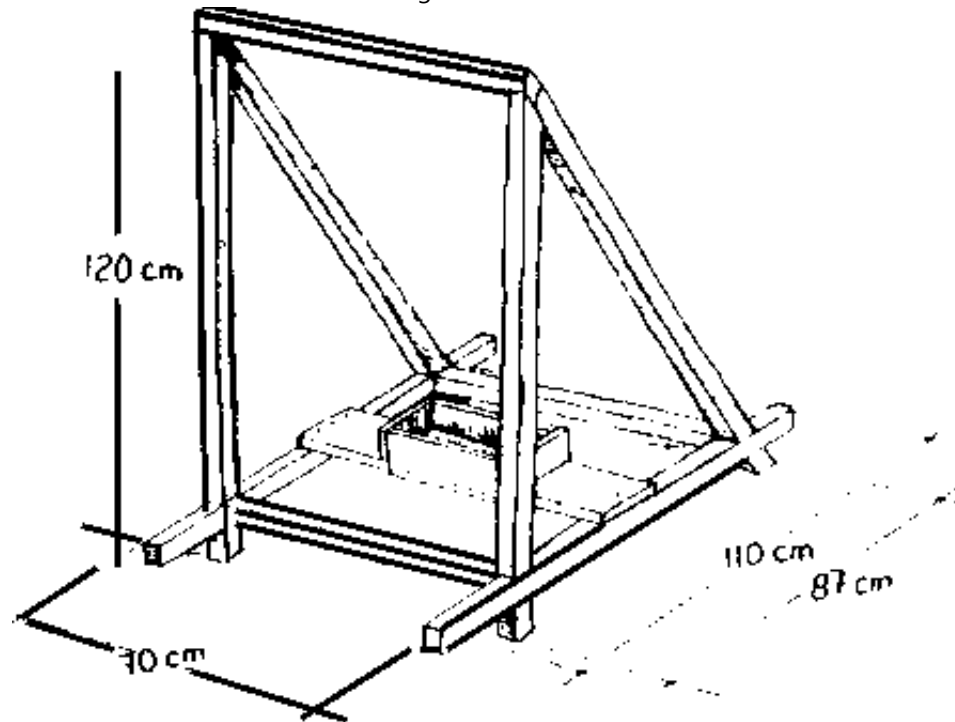
76. A multinutrient block feeder is specially designed to be handy and easy to make. It can be moved around the farm to follow the cattle grazing rotation.



Multinutrient block feeder

Building multinutrient block feeders

77. We can build a multinutrient block feeder ourselves using the following design and measurements.

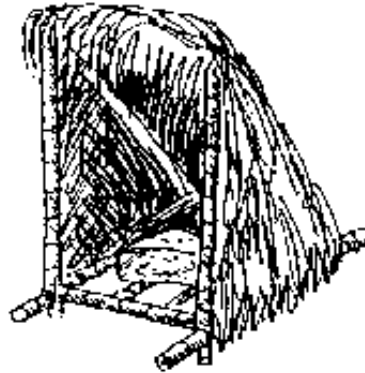


Multinutrient block

78. The block feeder is covered in a plastic or rubber fabric. It also has a curtain made of the same material, to prevent the

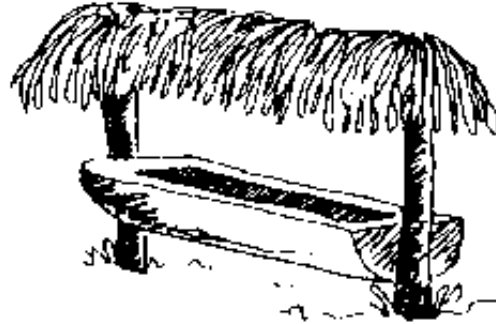
blocks from getting wet when it rains.

79. We can also build a multinutrient block feeder using materials available on the farm, such as bamboo, palm leaves and straws.



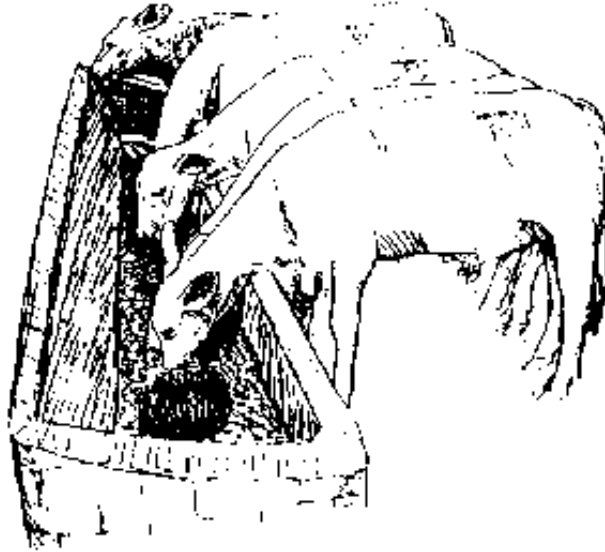
Multinutrient block feeder

80. If there are salting places on the farm, we can place multinutrient blocks beside mineral salt.



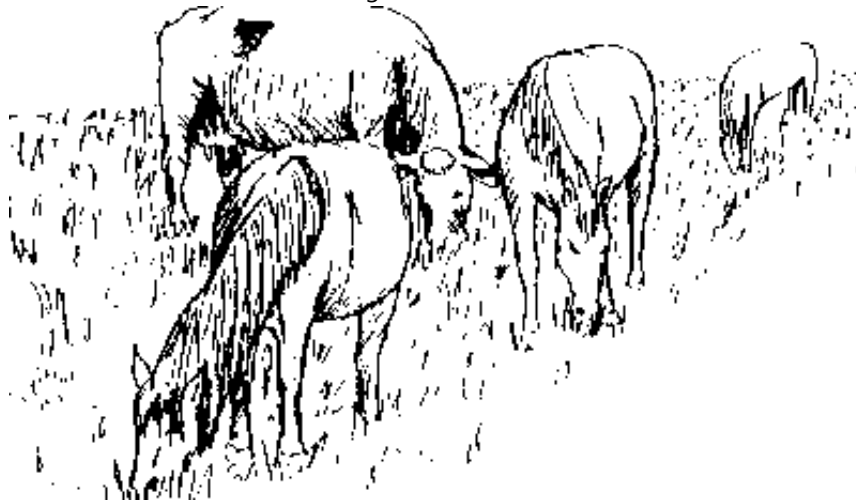
Multinutrient block feeder

81. If we keep cattle in stables or barns, we can place multinutrient blocks beside the animals' feed.



Multinutrient block feeder

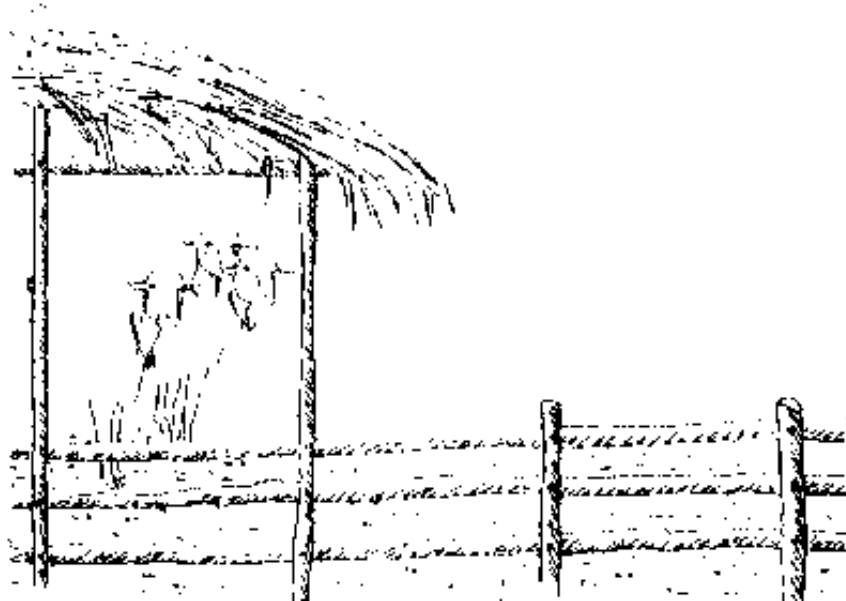
82. Horses do not need multinutrient blocks, but if they eat them it does not matter.



Multinutrient block feeder

83. Horses and cattle can graze together when multinutrient blocks are fed to them.

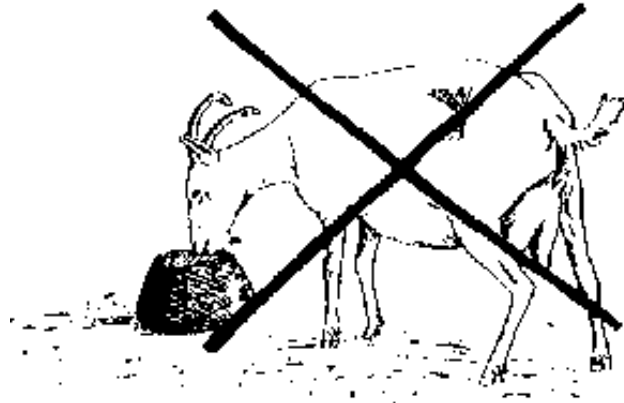
84. Goats and sheep that graze together on range pastures can be fed multinutrient blocks at their pen.



Multinutrient block feeder

85. Goats and sheep that are corralled in the afternoons can have multinutrient blocks at night.

86. Goats do not like dirty feed. They will not eat the multinutrient blocks if they are left on dirt.



Multinutrient block feeder

87. Goats need a goat feeder.

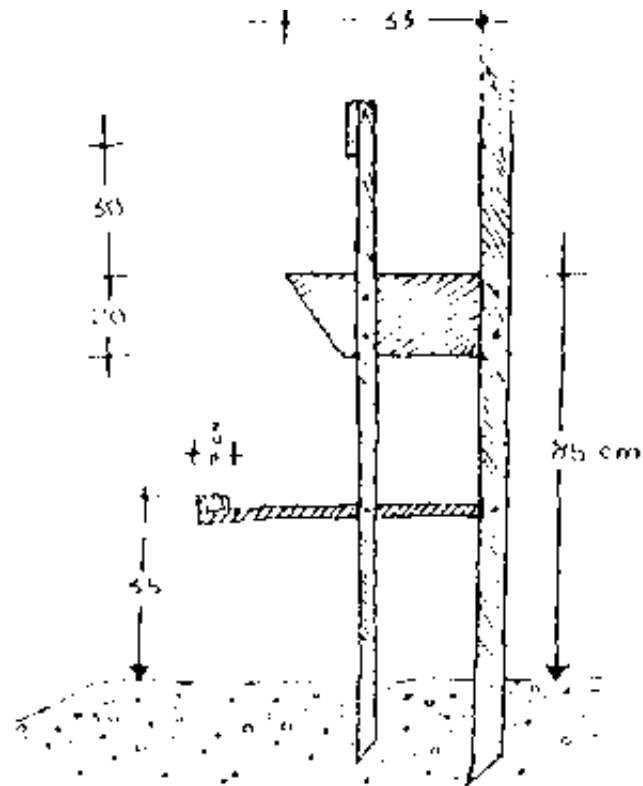
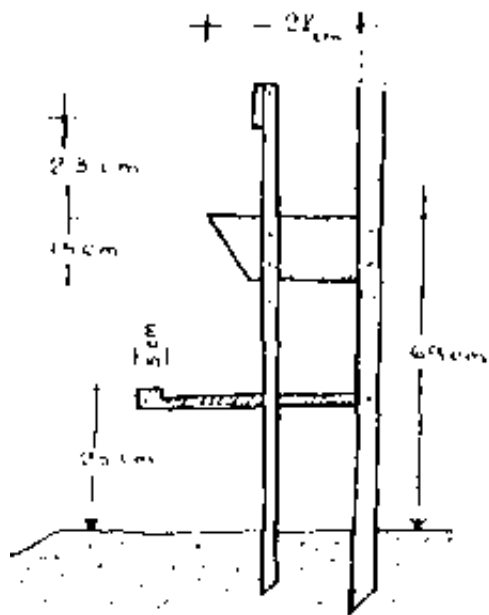


Goat feeder

88. This feeder designed for goats is very practical. Goats can reach the feed and the multinutrient block without defecating in it.

89. We can build a goat feeder by using the following design and measurements.

For young animals
For adult animals

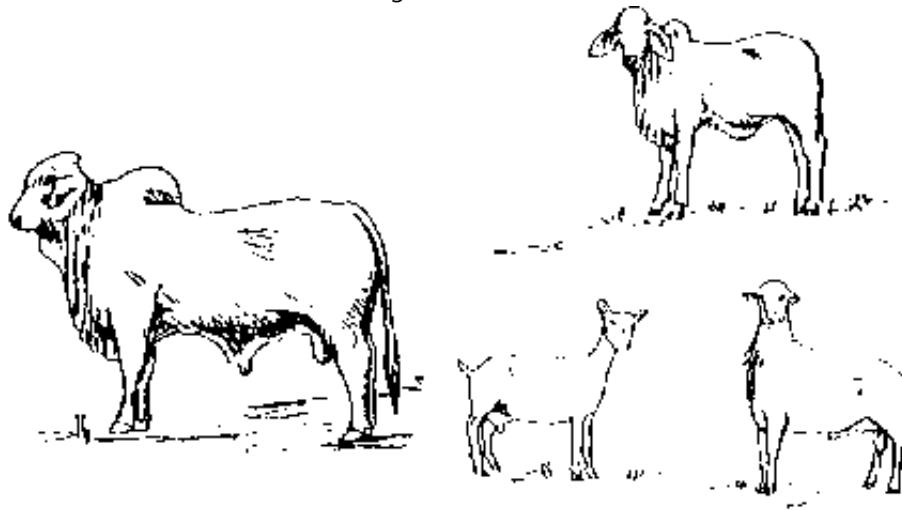


Goat feeder

90. Sheep feeders must be built half the height of goat feeders.

How to calculate the number of multinutrient blocks to make

91. Animals know how much mulitnutrient block they need and they will eat this amount.



Animals

92. To calculate how many kilograms of multinutrient block we need to make we count:

- the number of days that the multinutrient blocks last;
- the number of animals there are on the farm.

Then we calculate:

- the daily consumption of blocks on the farm;
- the daily consumption of blocks per animal.

93. To calculate the daily consumption of blocks on the farm, divide the weight of the blocks by the number of days they last.

94. To calculate the daily consumption of blocks per animal, divide the daily consumption of blocks on the farm by the number of animals.

95. For example: A 20- kg multinutrient block lasts ten days on a farm with four cows.

$20 \text{ kg}/10 = 2 \text{ kg}$ (daily consumption of blocks on the farm)
 $2 \text{ kg}/4 = 0.5 \text{ kg}$ (daily consumption of block per animal).

96. The following is the average consumption of multinutrient blocks of different animals.

Big ruminants	buffaloes	350 to 500 g daily
	cows	
	bulls	
	heifers	
	steers	
Calves	(from the time they start eating grass)	150 to 250 g daily
Small ruminants	goats	70 to 150 g daily
	sheep	

97. Warning! Animals can become intoxicated if they eat too much multinutrient block.

98. This happens when:

- The multinutrient block is too soft.
- The multinutrient block has lumps of urea in it.
- Animals are kept in stables or corrals with multinutrient blocks, but without other feed, and eat more blocks than they need.
- There is no transition period to let the animals get used to the multinutrient blocks.

99. Animals that have been intoxicated present these signs:

- They foam around the mouth.



Mouth

- The rumen appears swollen on the left side.



Rumen

- They seem to be drunk.



Animal

100. When the animals are intoxicated, we have to act as soon as possible to:

- Identify the sick animals.
- Remove the multinutrient block from the feeder
- Give vinegar and water to the animals. Calves, goats and sheep need half a litre of vinegar. Cattle and buffaloes need 2 litres of vinegar.



Vinegar

- Make the animals drink as much water as possible.



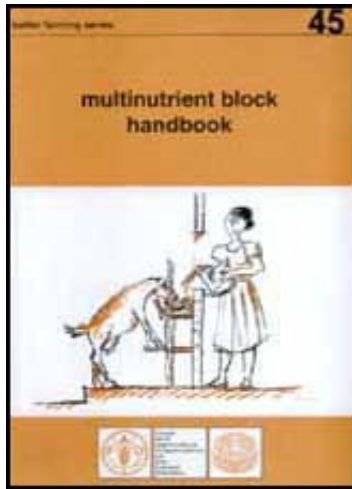
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Better Farming Series 45 -
Multinutrient Block Handbook (FAO,
1995, 28 p.)



(introduction...)



Preface



Acknowledgements



What are multinutrient blocks?



Animals that can be fed
multinutrient blocks



How to make multinutrient blocks



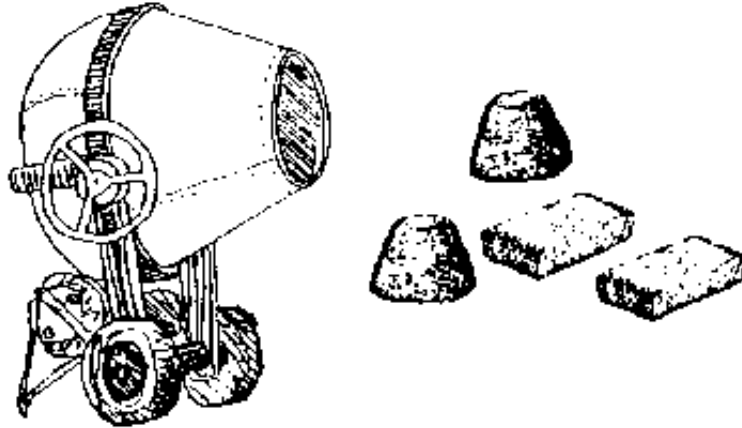
Feeding multinutrient blocks to
animals



Using a mixer to make multinutrient
blocks

Using a mixer to make multinutrient blocks

101. To prepare many blocks at the same time it is possible to use a concrete mixer or a regular feed mixer.



Mixer

102. The concrete mixer is the same as that used in building construction.

In some places concrete mixers can be rented for a day.

103. To prepare eight multinutrient blocks of 25 kg each, we must do the following.

104. Get the ingredients ready:

- 100 kg of sugar cane molasses;
- 20 kg of urea;
- 10 kg of cement;
- 10 kg of dolomitic lime;
- 10 kg of common salt;
- 10 kg of bonemeal;
- 40 kg of fibre.

105. Start the concrete mixer with the cylinder in a horizontal position and at a slightly lower speed than that used for concrete so that the mixture does not come out of the mixer.

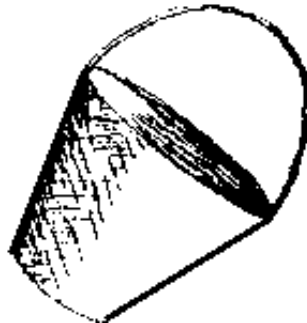
106. Pour the sugar cane molasses and the urea into the machine and let it run until the mixture looks even.

107. Add the:

- common salt;
- cement;
- dolomitic lime;
- bonemeal.

Then let the concrete mixer run for about five minutes until the ingredients are evenly mixed.

108. Now start pouring the fibre slowly into the mixer bucket by bucket and wait each time until the mixture looks even.



Bucket

109. While the ingredients are being mixed, to save time, we can get the moulds ready.

110. When the mixture is smooth and even, pour it into the moulds.

111. Place the moulds under cover in a dry place, and let the blocks dry out for 24 hours.

