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Appropriate Technology in Rural Development:  
Vehicles Designed for On and Off Farm Operations

Published by:

The World Bank  
Regional Development Unit  
Transportation Department  
1818 H Street, N.W.  
Washington, DC 20433 USA

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# *Appropriate Technology in Rural Development: Vehicles Designed for On and Off Farm Operations*

The information contained in this catalogue is provided by manufacturers or designers. The inclusion of any particular vehicle or implement does not signify that it is recommended by the World Bank. The World Bank has not verified the information provided by the manufacturers or designers as to the versatility, performance or any other features of the vehicles.

Regional Development Unit  
Transportation Department  
World Bank  
Washington, D.C. 20433  
USA

April 1978

APPROPRIATE TECHNOLOGY IN RURAL DEVELOPMENT:  
VEHICLES DESIGNED FOR ON AND OFF FARM OPERATIONS

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## FOREWORD

While an increasing number of low standard rural access roads or feeder roads are being constructed in developing countries, little attention is being given to the type of vehicles best used on them. The absence of appropriate means of low cost rural transport is in many cases a constraint to development and forces farmers to rely on headloading or other equally expensive methods for transporting farm produce and inputs. While vehicles commonly used in industrialized countries may be suitable for long and medium haul transport on primary and secondary roads in developing countries, such vehicles are not particularly suited to short distance transport on low standard rural roads, due to size, heavy axle loads, and the low-volume transport requirements of rural communities. There is thus a need for vehicles which are not only within the means of the rural population, but are also well adapted to the kind of daily agricultural and transport tasks facing small farmers.

The Transportation Department is studying the transport needs of rural communities with a view to encourage the development and adoption of more appropriate vehicles for rural transport. As a first step, information on vehicles already produced and sold commercially throughout the world was collected as well as information on various prototype vehicles. Many of these vehicles are wholly or in part designed and constructed in developing countries and are making use of local resources and labor.

Since this information was collected with difficulty from many diverse and scattered sources, and much could be of interest to those concerned with rural development or rural transport, it has been compiled in this reference document.

### Organization

The document consists of summary descriptions of vehicles. The vehicles range in level of sophistication from simple animal-drawn carts to small trucks able to carry several tons of goods. Many are not manufactured solely for road transport purposes, but may be used for farming applications as well. Also included are various types of small tractors which while primarily intended for agriculture may also serve as light transport vehicles.

Vehicles have been classified as follows:

#### NON-MOTORIZED VEHICLES

1. Animal or Motor Drawn Carts and Cart Assemblies
2. Pedal Vehicles

### MOTORIZED VEHICLES

3. Transport Vehicles: On-Road Goods and People Carriers
4. Transport Vehicles: On/Off Road Goods and People Carriers  
(All Terrain Vehicles)
5. Multi-Purpose Vehicles (Agriculture and Basic Transport)
6. Farm Vehicles: Single Axle Tractors
7. Farm Vehicles: Three and Four Wheel Riding Tractors
8. Products of Local Ingenuity

### Selection Criteria

The criteria used for determining which vehicles to include in the publication were: (i) relatively low purchase price, (ii) reasonably simple maintenance and repair requirements, (iii) satisfactory performance under varied temperature ranges as well as soil and climatic conditions, (iv) low fuel consumption, and (v) a wide range of transport and agriculture uses. All vehicles which, on the basis of information provided by manufacturers or designers, appeared to satisfy most of these criteria were included.

Some vehicles were both designed and manufactured in developing countries. Others were designed for use in developing countries but manufactured elsewhere. Still others were judged appropriate for use in the developing world while not actually designed with this purpose in mind.

Information supplied by the manufacturers on particular vehicles has not been verified by the World Bank. Those wishing further information on particular vehicles should contact the manufacturer directly. Prices have been listed (when available) in US dollars, and vehicle specifications in metric units. Export prices may change as a function of both real changes in purchase prices and fluctuating exchange rates. Also, delivered prices will depend on local taxes, customs duty, cost of freight, etc.

This initial survey is by no means exhaustive or complete. It is quite likely that many vehicles which should be included in a publication of this sort are not, due to lack of relevant information. It will therefore be greatly appreciated if readers who know of other suitable transport or

farm vehicles would complete the summary forms at the back of this document and return them to:

Regional Development Unit  
Transportation Department  
World Bank  
Washington, D.C. 20433  
USA

Information on field testing or actual experience will also be helpful.

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NON-MOTORIZED VEHICLES



1. ANIMAL OR MOTOR DRAWN CARTS AND CART ASSEMBLIES

Six carts are described in this section; four are designed for use with draught animals and two may be pulled either by a draught animal or motorized vehicle. In addition, one manufacturer supplies pneumatic wheel assemblies and brakes for use with carts of any design.

Two of the manufacturers market fully assembled carts in the price range of US\$191-795. A third manufacturer sells carts in kit form (US\$903) which can be constructed using simple tools and a welding set. The remaining three carts are designed for construction in developing countries using local labor and resources. Plans and descriptions of required materials are available.

## SISCOMA's Animal-Drawn Carts

SISCOMA

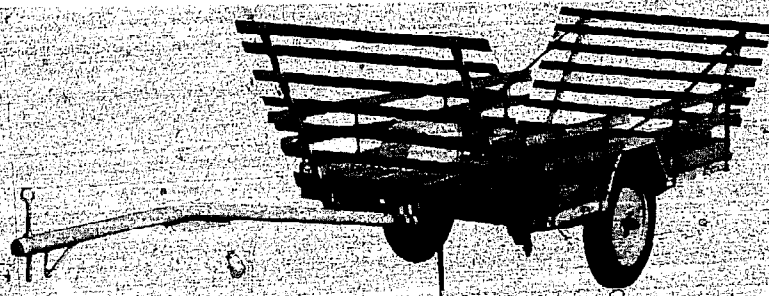
BP 3214

Dakar

Senegal

Telephone: 223-75

Telex: 585 "SISCOMA-DAKAR"



### Description:

#### Donkey Cart

- Full square axle (35 x 35 mm) in A.60 steel.
- 1 set of two tapered roller bearings on each spindle.
- Useful load of 400 to 500 kg.
- Pneumatic tires for on-farm use (135 x 13).
- Floor dimensions 1600 x 920 mm.

#### Horse Cart

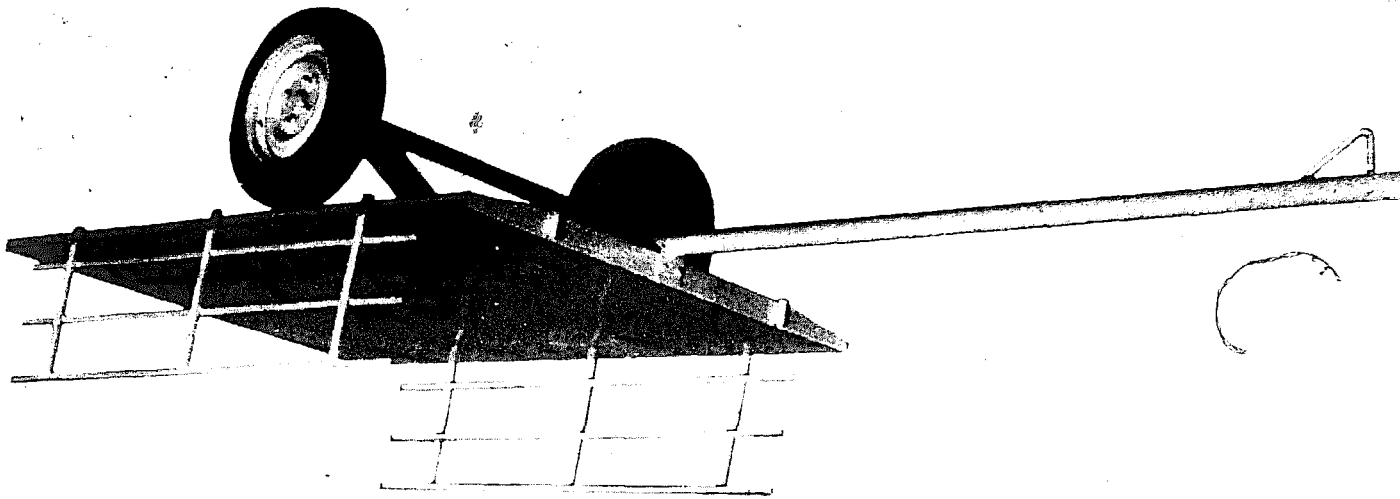
- Full square axle (40 x 40 mm) in A.60 steel.
- 1 set of two tapered roller bearings on each spindle.
- Useful load 1000 kg.
- Equipped with 2 harness shafts.
- Pneumatic tires for on-farm use (165 x 14 or 155 x 15).
- Floor dimensions 2000 x 1150 mm.

#### Ox Cart

- Full square axle (45 x 45 mm) in A.60 steel.
- 1 set of 2 tapered roller bearings on each spindle.
- Useful load of 1500 to 1700 kg.
- Equipped with a central harness pole.
- Floor dimensions 2490 x 1500 mm.
- Choice of flooring in either wood or sheet metal.
- Pneumatic tires for on-farm use (185 x 14 or 600 x 19).

#### Ferlo Type Ox Cart for Forage

- Full square axle (45 x 45 mm) in A.60 steel.
- 1 set of 2 tapered roller bearings on each spindle.
- Useful load 1500 to 1700 kg.
- Floor dimensions 2500 x 1500 mm.
- Equipped with high sides.
- Pneumatic tires for on-farm use (185 x 14 or 600 x 19).



Total production of all kinds of carts for 1977/78 - approximately 20,000 units.

Donkey cart	US\$191
Horse cart	US\$234
Ox cart	US\$369
Ferret type ox cart	US\$641
Mould type	US\$795
Two axle cart	

Ex-factory price, net of tax and duty.

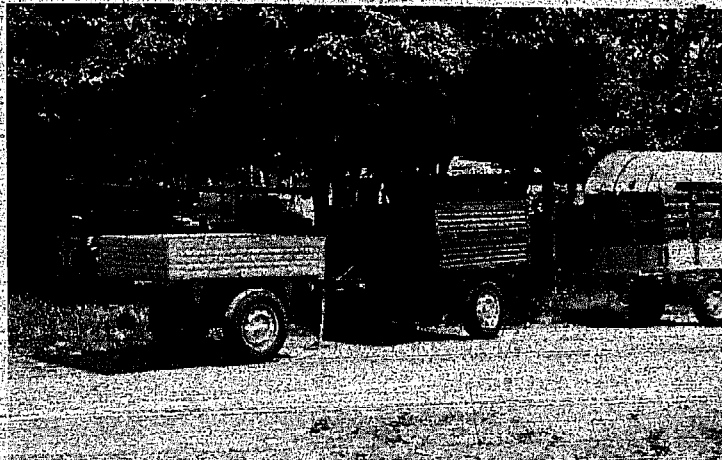
Cost and Present Status (as of 10/25/77).

Comments on Maintenance, Productivity, "Appropriateness," etc.: These various models have been manufactured since 1961; designed cooperatively through collaboration with Senegal's Department of Agriculture and the farmers themselves. Tested by the Machinery Division of the National Agricultural Research Center at Bambey. The cart's hub and bearing assembly is attached to the axle by means of a pinned castle nut and is sealed with a dust proof cover; exported to several West African countries; specific modifications to the basic models have been made at the customer's request in order to adapt them to local needs; also, some models can be modified for hitching to a small tractor.

- Mould type two axle cart
- Swivel front axle.
- Full square rear axle (45 x 45 mm) in A.60 steel.
- 1 set of 2 tapered roller bearings on each spindle.
- Useful load 1500 to 1700 kg.
- Floor dimensions 2490 x 1500 mm.
- Pneumatic tires for on-farm use (185 x 17 or 600 x 19).

### Trailers ALAS

Industrias Alas Ltda.  
Cra. 3 Oeste #4-50  
Barrio El Penon  
Cali  
Colombia, S.A.  
Telephone: 861323-731397-731061



Description: A light trailer designed for heavy work on village roads; built with pressed sheet metal; heavy duty suspension.

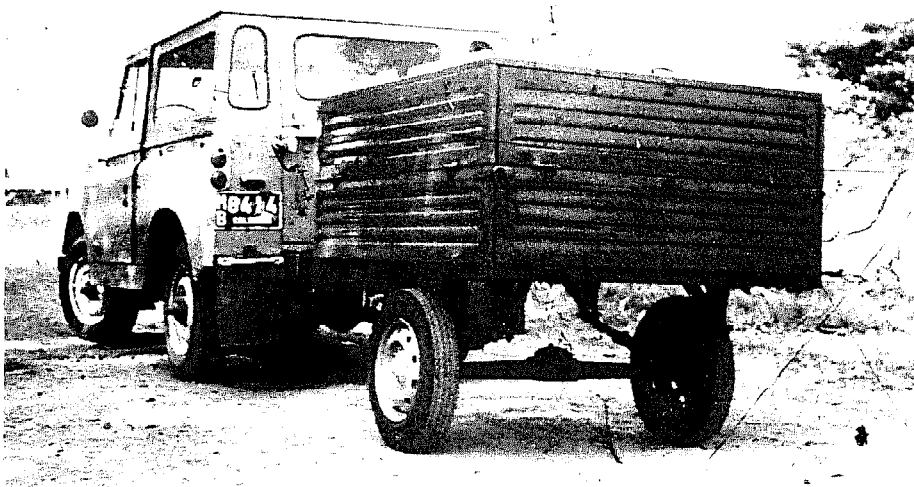
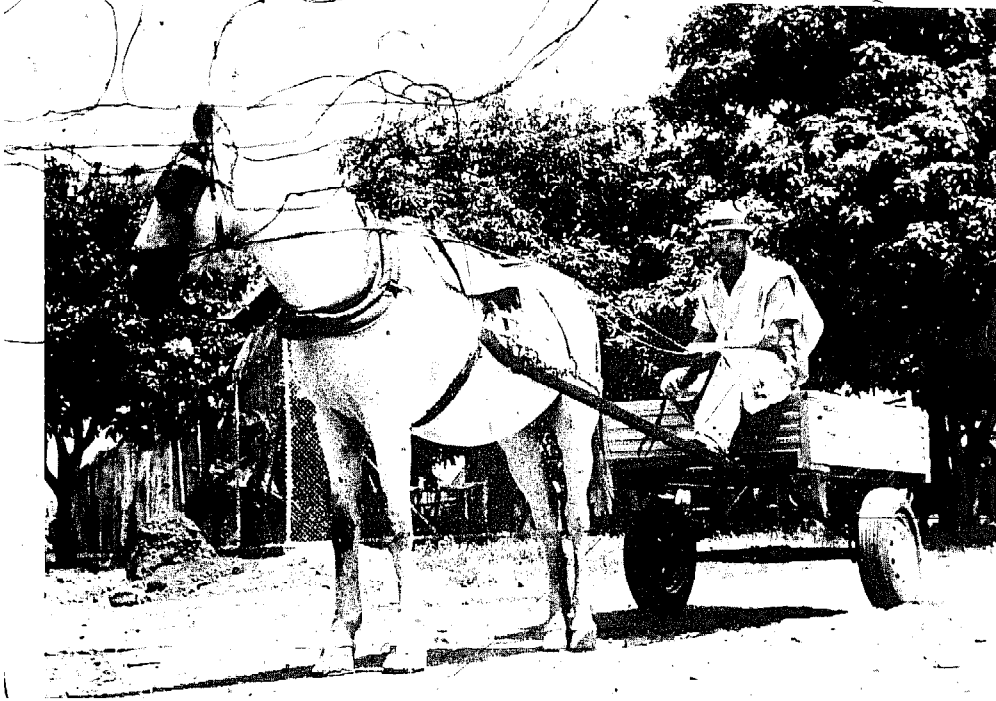
### Specifications

weight	=	131 kg
length	=	1.45 m
width	=	1.3 m
height	=	1.0 m
wheel base	=	1.1 m
ground clearance	=	.27 m
payload	=	500 kg

Comments on Maintenance, Productivity, "Appropriateness," etc: May be pulled either by engine power or animal power; maintenance consists of periodically oiling the wheel bearings; appropriate for many types of hauling; expected life is five years.

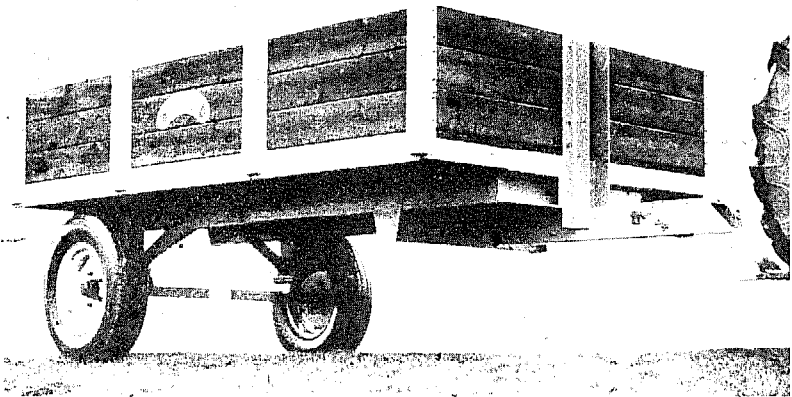
### Cost and Present Status (as of 2/20/78):

Trailer	US\$750.00
Draft Horse Shaft	70.15
Jib for the Draft Horse Shaft	23.98



Kit Trailer # 35NTW

Weeks Trailers Ltd.  
Ferry Road  
Hessle  
North Humberside HU13 ODZ  
England  
Telephone: 0482 - 649171  
Telex: 52612  
Cable: 'Weeks' Hull.



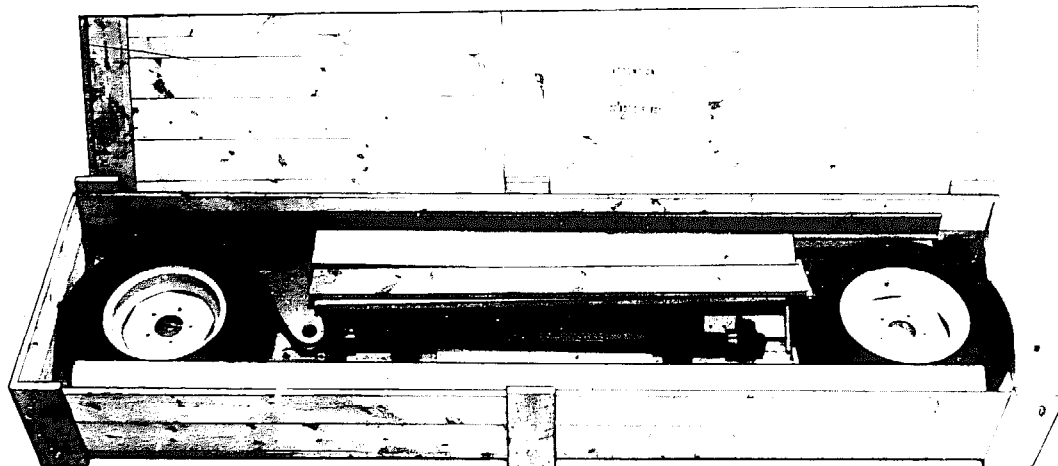
Description: Agricultural trailer which utilizes the packing case as the trailer's body and uses local labor in assembly.

Specifications

weight - 600 kg  
overall length - 4.16 m  
width - 1.83 m  
ground clearance - .33 m to axle and towing hitch level  
height of trailer  
  sides - .45 m  
payload capacity - 13,500 kg

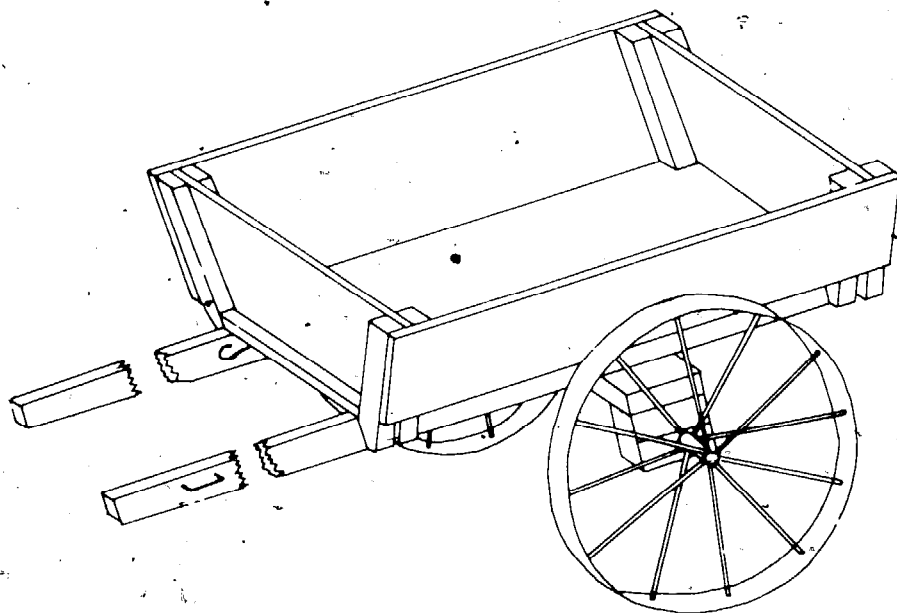
Comments on Maintenance, Productivity, "Appropriateness," etc.: Kit trailer is especially designed for assembly using local labor; because of 'easy stage' construction method, only simple hand tools and welding set are required; used in over 40 countries.

Cost and Present Status (as of 2/17/78): US\$ 903 net F.O.B. U.K. Port



Cart (for one draught animal)

Intermediate Technology  
Publications Ltd.  
9 King Street  
London WC2E 8HN,  
England  
Telephone: 01-836-6379



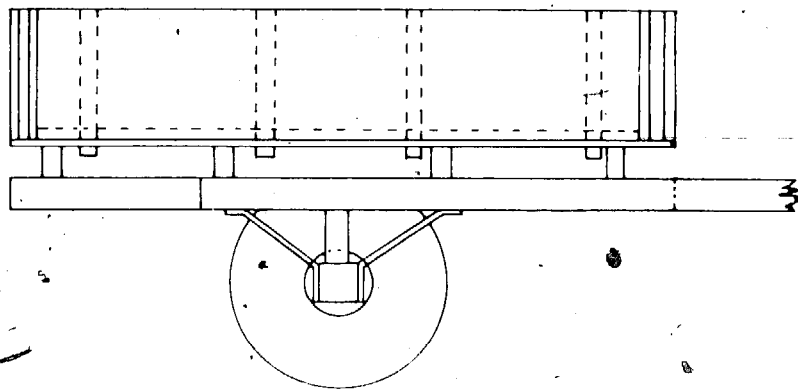
Description: Pulled by a single ox or donkey; payload-318 kg; the wood-block axle bearings fitted underneath the cart body are oil-impregnated by soaking in hot oil before drilling and assembly; the front and back boards of the cart body are removable; the cart shafts can be made of tubular metal pipe instead of timber if extra-strength is found necessary.

Comments on Maintenance, Productivity, "Appropriateness," etc.:  
Designed for local construction.

Cost and Present Status (as of 7/77): Developed by J. Wirth, engineer at TAMTU (Tanzania Agricultural Machinery Testing Unit), Tanzania; more complete drawings and description of the materials required can be obtained from Intermediate Technology Publications Ltd.

Ox-Cart (using old car wheels)

Intermediate Technology  
Publications Ltd.  
9 King Street  
London WC2E 8HN,  
England  
Telephone: 01-836-6379



Description: Pulled by two-oxen; this cart makes use of the front wheels from an old car or lorry; the wheel mountings are welded on to a box-section axle, fabricated from angle iron; (a car rear axle, complete with differential can be used, but this would add unnecessary bulk and weight to the cart); this cart chassis and body are constructed of wood and all parts are bolted together; the body side and end boards are made of planks 19 mm in thickness, and are detachable.

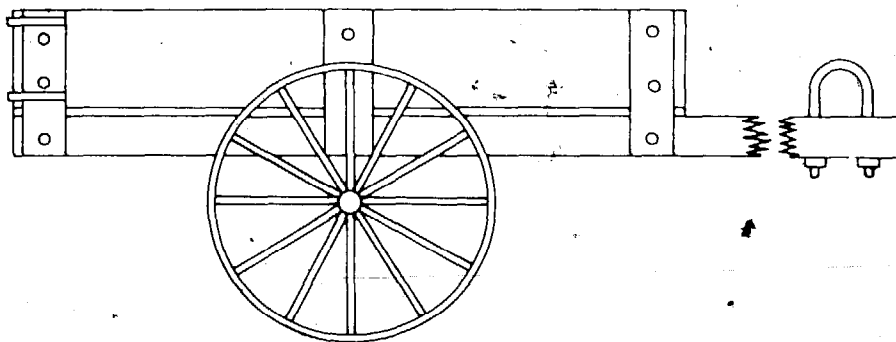
Comments on Maintenance, Productivity, "Appropriateness," etc.:  
Designed for local construction.

Cost and Present Status (as of 7/77): Developed by Rev. L. H. Robertson, Mlanje, Malawi; more complete drawings and description of the materials required can be obtained from Intermediate Technology Publications Ltd.



Wananchi Ox-Cart

Intermediate Technology  
Publications Ltd.  
9 King Street  
London WC2E 8HN,  
England  
Telephone: 01-836-6379



Description: Pulled by two-oxen; payload-636 kgs.; an important design feature of this cart is the wood-block axle bearings—each bearing is made of two pieces of wood, impregnated by soaking in hot oil, the axle bearing hole, 38 mm diameter, is drilled centrally through the blocks; each wheel assembly is an integral unit, the wheel spokes are welded to the axle shaft.

Comments on Maintenance, Productivity, "Appropriateness," etc.: Designed for local construction; this bearing design facilitates ease of maintenance and renewal of the bearings by carpenters in rural areas.

Cost and Present Status (as of 7/77): Originally designed by Rev. V. Swenson of Singida Mission and later developed further at TAMTU (Tanzania Agricultural Machinery Testing Unit), Tanzania; more complete drawings and description of the materials required can be obtained from Intermediate Technology Publications Ltd.

Dunlop Pneumatic Tire Equipment  
for Animal Drawn Vehicles

Dunlop India Limited  
Dunlop House, 57B  
Mirza Ghalib Street  
Calcutta-700 016  
Post Office Box No. 9023  
INDIA

Telephone: 24-9641/49  
Telegraph: COVERS



Description: Pneumatic plain, ribbed pattern tire assemblies, including axle, 2 tires, hubs, and optional cast iron brake drums and lined shoes; pressed steel disc wheels under-coated to resist erosion; various tire sizes (5.00-19 to 8.00-19); plys, and axle lengths; complete instructions for various appropriate cart designs available on request.

Specifications

ply ratings - 6 pr, 8 pr, and 10 pr  
hub design - standard or heavy  
axle section - 40, 50, 56, and 60 mm  
gross load per axle - 1,340 - 3,320 kg  
weight of complete  
assembly (without brakes) - 56.3 - 131.65 kg  
standard track widths - 1,370 mm and 1,525 mm

Comments on Maintenance, Productivity, "Appropriateness", etc.: These tire assemblies are designed to be used in place of iron tires on animal drawn carts, thus minimizing rolling resistance and allowing a low loading height which lowers the center of gravity of the loaded cart; carts with pneumatic tires travel some 25% faster than iron-tired carts; also, a pneumatic tired cart will remain mobile in soft or marshy ground and do less damage to road surfaces. This wheel assembly encourages buyers to construct an appropriately designed cart out of locally available materials.

Cost and Present status (as of ):



## 2. PEDAL VEHICLES

The two pedal vehicles included are of the three-wheel type and are designed to carry a rider plus goods or passengers. Neither is provided with a prefabricated box or cabin for carrying purposes. Such additions could easily be made locally. Plans for various load carrying designs can be obtained.

One of the three-wheelers is presently in the prototype stage. It was designed for manufacture in the developing countries. The second is manufactured only in the US and sold commercially throughout the world. Both are built for use under rough conditions.

OXTRIKE

S. S. Wilson  
Department of Engineering  
Science  
University of Oxford  
Parks Road, Oxford OX1 3PJ  
England  
Telephone: 59988



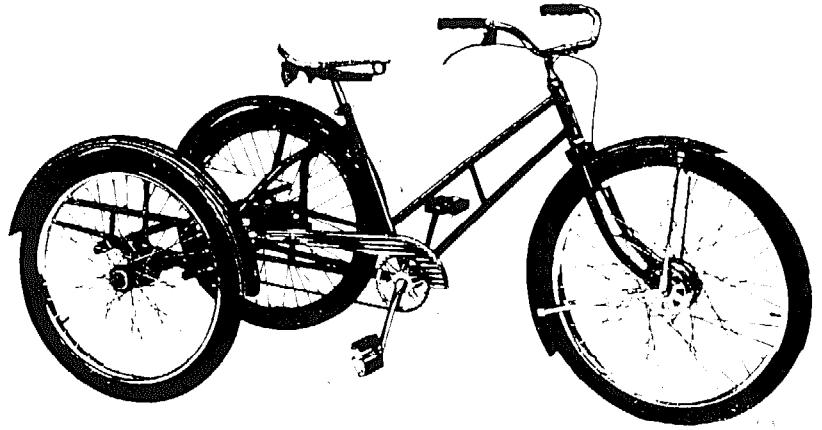
Description: Two-wheels in the rear are driven by a simple differential mechanism based on two standard sprockets and freewheels; standard 3-speed gearbox; band brakes on each rear axle; front wheel and fork are standard carrier bicycle type, able to carry heavy loads; rear wheel of the chopper type; payload: 2 passengers or 150 kg.

Comments on Maintenance, Productivity, "Appropriateness," etc.: Since design is based on standard bicycle components and chassis is made from sheet steel of 1.6 mm thickness, they can be built locally in small workshops from kits of parts as is common practice in India; designs include rickshaw, multi-use body, box-van body, hopper body, and water cart; requires roads with reasonably level surfaces; its scope can be extended by addition of a small motor; pedal carts and cycle rickshaws are used on a large scale in India, China, and Southeast Asia.

Cost and Present Status (as of 5/77): Prototype.

Adaptable Tricycle with  
Platform-Model ADP

Worksman Trading Corp.  
139-151 Banker Street  
Brooklyn, N.Y. 11222  
Telephone: 212.388.5710  
Telex/Cable: WORKCYCLE - NEW YORK



Description: (1) Chassis-heavy gauge steel tubing 2.56cm-16 gauge, 2.26cm solid steel axle, axle width-.8m; (2) Wheels-heavy duty ball bearing wheels-.66m front & .61m rear, hand controlled drum brake on front wheel, free-wheeling on rear axle, available with 3 solid tire puncture proof wheels, rear coaster brake available, (3) Equipment-vinyl padded seat, chromium handlebars, and heavy duty mudguards.

Comments on Maintenance, Productivity, "Appropriateness," etc.: This adaptable tricycle line is used in many large manufacturer facilities throughout the world; setup and maintenance instructions are provided to assist owner in securing the maximum service from the cycles.

Cost and Present Status (as of 3/1/78): ADP Model-US\$232, list price when ordered in quantities of 7 or more; all prices are F.O.B. factory Brooklyn, N.Y.

Other models include:

(list price for quantities  
of 7 or more)

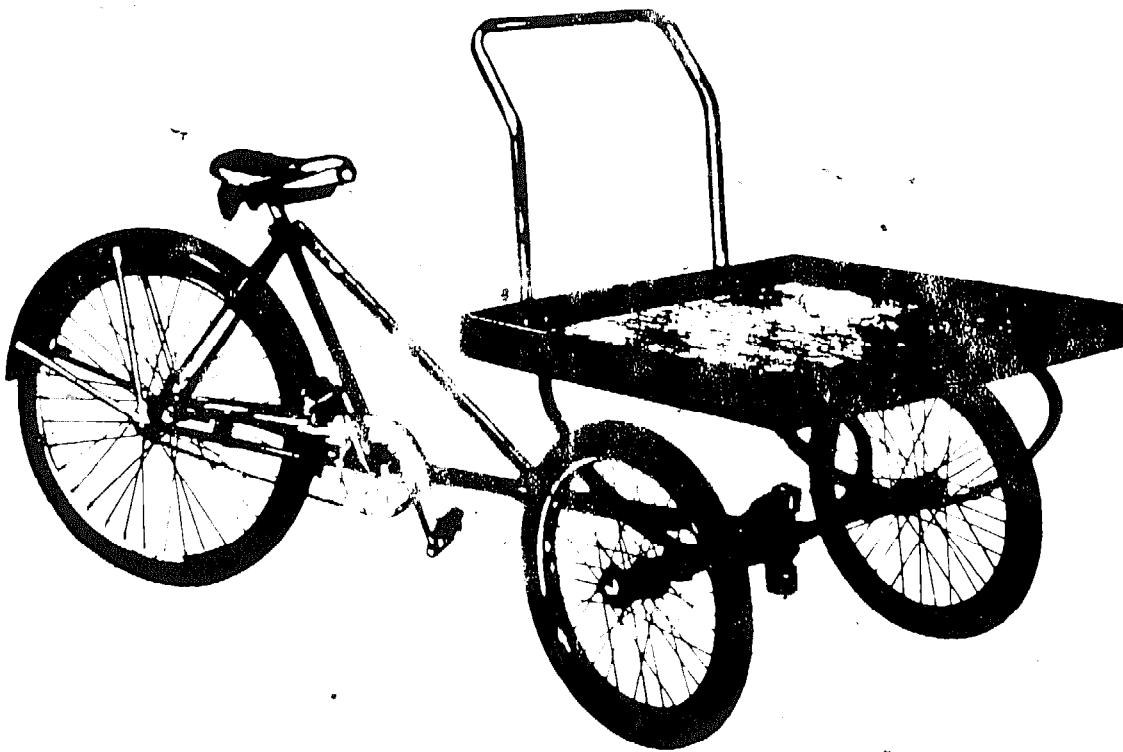
Middleweight Adult Tricycle	US\$ 228
Standard Delivery Tricycle (Cabinet size: 67cm x 92cm x 67cm)	US\$ 285
Utility Tricycle (Platform: 87cm x 77cm-over the wheels)	US\$ 239
Ice Cream Tricycle	US\$ 615

Cost and Present Status (as of 5/15/77): ADP Model-US \$218, list price when ordered in quantities of 7 or more; all prices are F.O.B. factory Brooklyn, N.Y.

Other models include:

(list price for quantities of 7 or more)

Middleweight Adult Tricycle	US \$190
Standard Delivery Tricycle (Cabinet size: 67cm x 92cm x 67cm)	US \$273
Utility Tricycle (Platform: 87cm x 77cm-over the wheels)	US \$230
Ice Cream Tricycle	US \$570



MOTORIZED VEHICLES



### 3. TRANSPORT VEHICLES: ON-ROAD GOODS AND PEOPLE CARRIERS

Seven vehicles are described in this section. Five are light three-wheeled vehicles powered by engines ranging from 5 hp to 15 hp. Prices range from US\$700-1,700. Three-wheeled vehicles of this type have been used increasingly in South Asia and the Middle East in recent years. They are versatile, carrying as many as seven or eight people and up to 750 kg, and travelling at speeds up to 60 km per hour. Low fuel consumption keeps fuel costs down, and simple design of vehicle components permits easy maintenance. All but two of these vehicles are at least in part manufactured in South Asian countries. One of the three-wheelers is manufactured in Crete, a country which has evidenced increased production of low-cost three-wheeled vehicles.

The remaining two vehicles are small, standard four-wheel pickup trucks (42.5 and 77 hp) which cost from US\$3,100-3,600. One is manufactured in Thailand and sold only in local markets. The other is marketed through distributorships in several developing countries. Sheet metal fabrication and generally assembly are performed locally, while mechanical components (engine, transmission, etc.) are imported.

Type 250 cc



Super Helicak-250cc

Italindo  
Jalan Jenderal A. Yani-Bypass  
Jakarta, Indonesia  
Telephone: 81514  
Telex/Cable:

Description: 2 cylinder, 2 cycle, centrally mounted 12 HP Italindo engine; electric starter; fuel is regular gas mixed with 3 to 4 percent SAE 40 oil; transmission -- automatic 4 speeds forward and one reverse; all steel body; coil springs with double-action oil shock absorbers; hydraulic expansion-type brakes and hand brake.

Specifications:

weight	-	engine	- 12 HP
length	-	speed	- maximum - 50 km/h
width	-		- cruising - 35-45 km/h
height	-	fuel capacity	-
wheel base	- 1.96 m	fuel consumption	- 15 km/l
track	- 1.23 m		

payload capacity - 3 passengers (150 kg)  
plus 20 kg of cargo  
in area beside the  
driver's seat

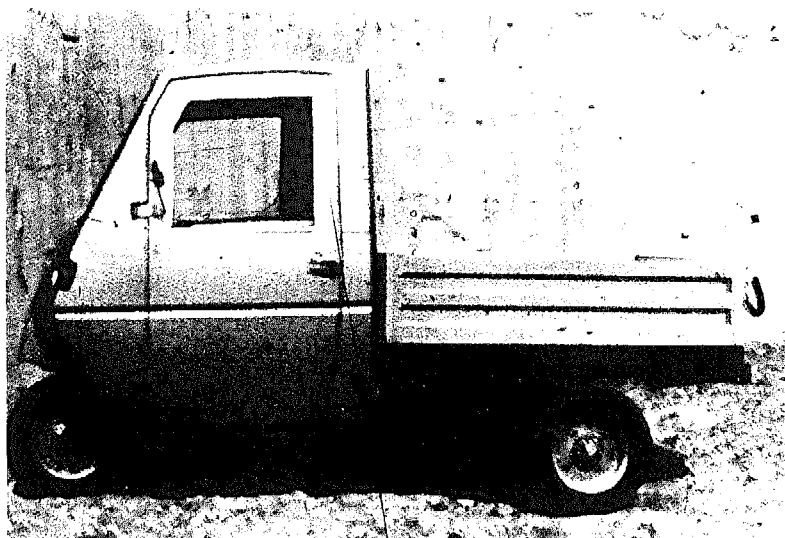
Comments on Maintenance, Productivity, "Appropriateness," etc.:

Cost and Present Status (as of ): Super Helicak-250cc - US \$

Also available 6 HP engined Super Helicak-125cc US \$

MEBEA Goods Transport  
Threewheeler Type No. 206

Mediterranean Engine Brand  
Enterprises Association S.A.  
P.O. Box 30  
Kifissia  
Athens  
Greece  
Telephone: 822.6060/822.2539  
Telgrams: MEBEA ATHENS  
Telex: (21) 5827



Description: Three-wheeled goods transport vehicle with 50cc or 135cc ZUNDAPP engine, 4-speed or 5-speed, single cylinder, 2-stroke, 5.6 SAE-hp at 7,700 rpm, air-cooled; runs on a 25:1 petrol to oil mix; all steel tubular and sheet metal chassis; hydraulic and hand brake on rear wheels, mechanical brake on front wheel; start by manually operated hand lever; BOSCH flywheel type electrical system.

Specifications

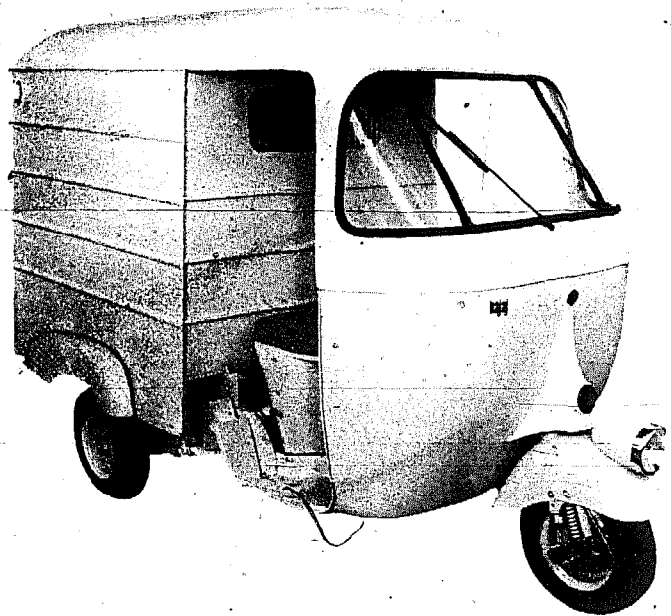
weight	- app. 189 kg.	engine	- 5.6 SAE-hp
length	- 2.63 m	speed	- avg. of 55 km/h
width	- 1.2 m	fuel capacity	- app. 5 litres
ground clearance	-	fuel consumption	- app. 27 km/litre
height	- 1.0 m (without cabin)		
payload capacity	-		

Comments on Maintenance, Productivity, "Appropriateness", etc.: Used in Greece for over 20 years for light transport tasks; two engine sizes appropriate for different uses; also, enclosed or open driver's cab available.

Cost and present status (as of \_\_\_\_\_):

(135 cc engine model available soon)





Bajaj Three Wheeler Chassis; Autoriksha,  
Pickup Van and Delivery Van

Bajaj Auto Ltd.  
Akurdi, Poona-411 035  
Maharashtra,  
India  
Telephone: 82551/83011  
Telex : PN 0145-308  
Cable : AUTORIKSHA

Description: 3 wheeled vehicle which comes in 3 styles for passenger/freight transport: autoriksha, pickup van, and delivery van; midmounted engine, two stroke, single cylinder, 5.7 hp (at 5000 RPM) 150 cc, air cooled engine running on petrol and oil mixture; rear wheel driven, four forward, one reverse gear; pedal operated hydraulic rear brakes, hand operated mechanical brake for front wheel, parking brakes on rear wheels.

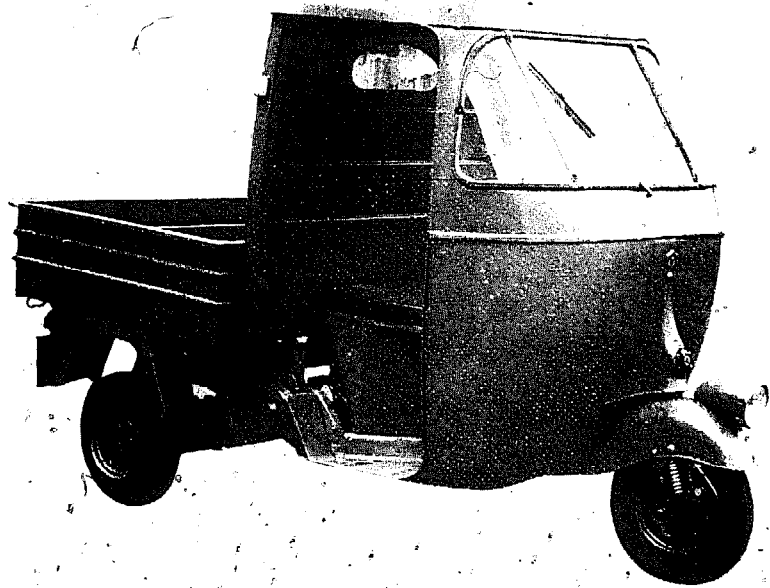
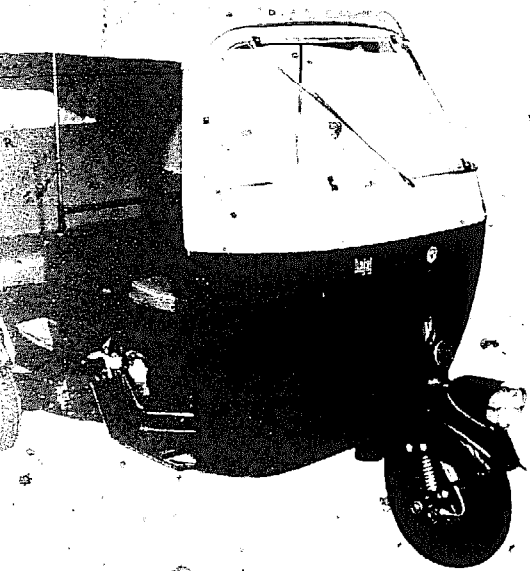
Specifications

weight	- 260 to 290 kgs	engine	- 5.7 hp at 5000 RPM
wheel base	- 1.65 m	speed	- 0 to 55-60 km/hr.
ground clearance	- .02 m	fuel capacity	- 11 litres
payload	- 310 to 500 kgs	fuel consumption	- 26+ 5 km/litre

Comments on Maintenance, Productivity, "Appropriateness," etc.: Low cost road vehicle which is in use in the Middle East, South East Asia and Africa; three different styles suited to various uses; drive away chassis is available for fitting locally fabricated bodies; optional equipment includes electric windshield wiper and battery.

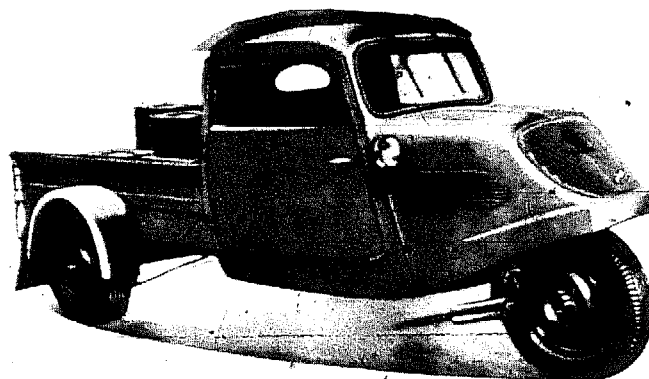
Cost and Present Status (as of 1/78): F.O.B. Bombay prices of basic models.

Drive away chassis	- app.	US\$625
Autoriksha	- app.	US\$705
Pickup Van	- app.	US\$705
Delivery Van	- app.	US\$784



Tempo 3-Wheeler Pick-Up Truck

Bajaj-Tempo Ltd.  
Bombay-Poona Road  
Akurdi Poona 411 035  
India  
Telephone: 82281  
Telex/Cable: 0145-352/TEMPOWORK



Description: 2 cylinder, 2 stroke, 15 HP petrol engine designed by Henschel AG of Stuttgart, Germany; steel tubular chassis with cross members; the entire drive unit i.e. engine, gear box, and chain case is mounted on the front wheel; gear-box -- 4 forward, 1 reverse gear; front wheel drive; brakes -- hydraulic brakes on all 3 wheels and independent mechanical hand brakes on 2 rear wheels; suspension -- rear axles have independent suspension assisted by dual coil springs and telescopic shock absorbers; steering -- adjustable worm and segment.

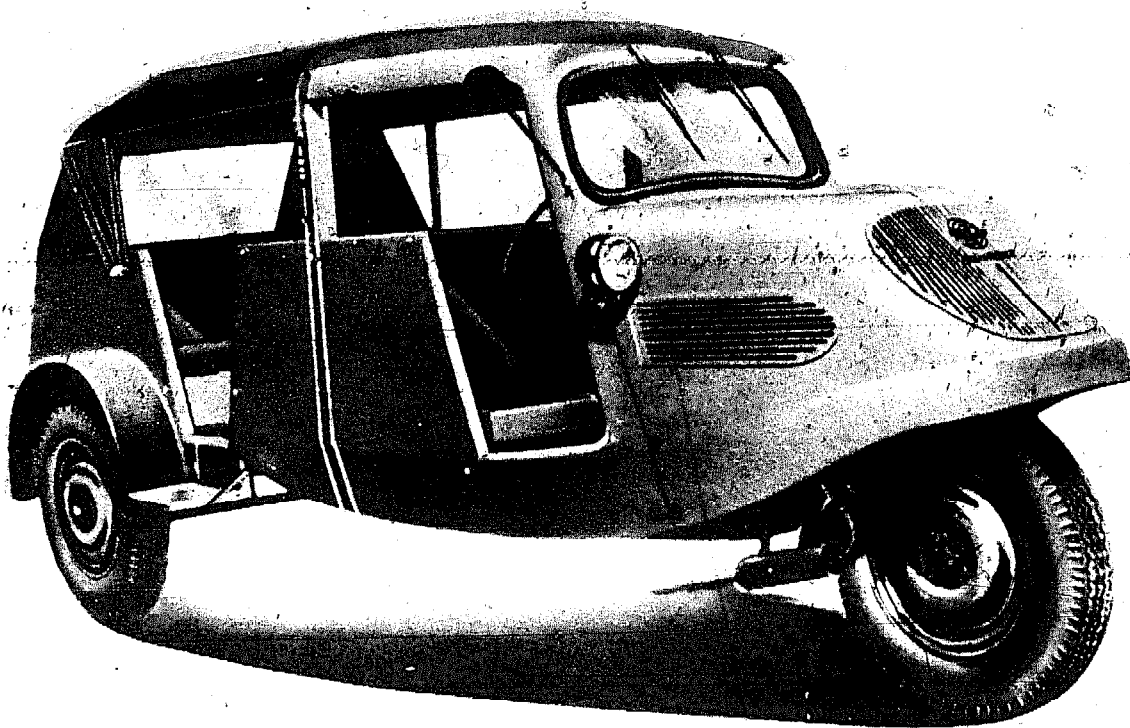
Specifications:

weight	-	engine	- 15 HP
length	- 3.57 m	speed - maximum	- 60 km/h
width	-	fuel capacity	- 12 l
height	- 1.55 m	fuel consumption	- 12.4 km/l
wheel base	- 2.87 m		
track (rear)	- 1.37 m		

payload capacity - 750 kg

Comments on Maintenance, Productivity, "Appropriateness," etc.: Entire power unit can be dismantled within 1 hour; expected life under normal use on good and bad roads is about 6 to 8 years or 150,000 kms; petrol and oil must be mixed in 40:1 proportions; runs well on rough roads but cannot operate in conditions where 4-wheel drive is essential; other models include delivery van, refuse truck, water and kerosene tanker, ambulance, and autorickshaw; as a autorickshaw, designed to carry 7 passengers but known to carry up to 20.

Cost and Present Status (as of 7/5/77): PICK-UP model - US, \$1,394 (this price is ex-works without excise duty and without the mark-up by the dealer); is manufactured in collaboration with the German firm Vidal & Sohn Tempo Werk; have been manufacturing this vehicle since 1959 and the maximum quantity ever produced in one year was 3,500; the investment required to initiate the production of this vehicle is not prohibitive for some developing countries.





Krishi Auto-Rickshaw

Krishi Engines Limited  
A-7 Unit, Sanatnagar.  
Hyderabad-500018  
India  
Telephone: 269306  
Telex: CARE 015-372 ESTATE



Description: Compact 7-seater including driver; powered by a water-cooled, 4 stroke, single cylinder, 5 HP diesel engine; 4 speed gear box; hydraulic braking system; self-starting facility with a 12V battery.

Specifications:

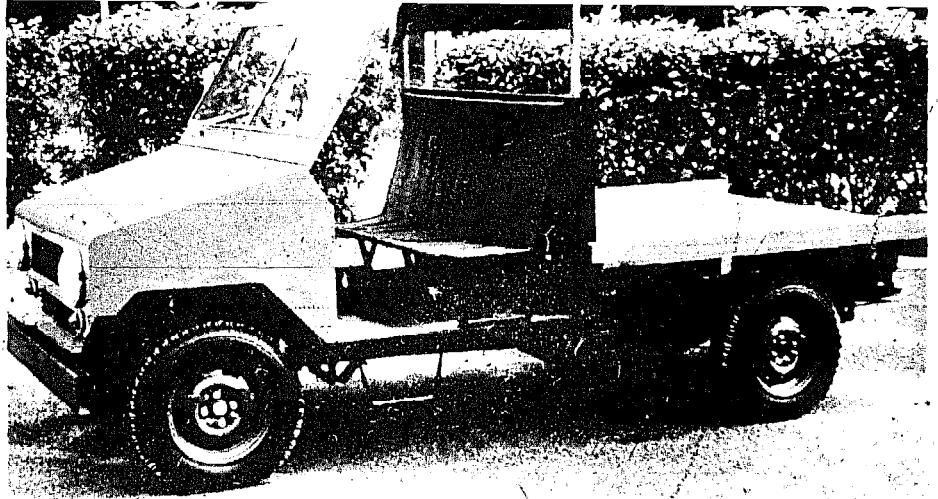
weight	-	600 kg	engine	-	5 HP
length	-	2.75 m	speed--maximum	-	45km/h
width	-	1.15 m	fuel capacity	-	7 litres
height	-	1.68 m	fuel consumption	-	17 km/l
payload capacity - 7 people					

Comments on Maintenance, Productivity, "Appropriateness," etc.:  
Tested for use in urban areas and country roads.

Cost and Present Status (as of 6/30/77): US \$1,700

## BASIC TRANSPORTATION VEHICLE

B.T.V. Operations Group  
Bedford Commercial Vehicles  
Vauxhall Motors Ltd.  
P.O. Box No. 3,  
Luton LU2 OSY  
England  
Telephone: 0582 21122  
Telex: 82131 VAUXGM (G)



Description: Water-cooled, 4-cylinder petrol engine of 42.5 hp; 4-speed synchromesh transmission with floor mounted gear lever; two-wheel drive; rack and pinion steering; dual circuit hydraulic service brakes.

### Specifications

weight	- 1,321 kg	engine	- 42.5 HP
length	- 3.6 m	speed (maximum)	- 97km/h to 105km/h
width	- 1.6 m	fuel capacity	- 36.5 litres
height	- 1.7 m	fuel consumption	- 8-9 km/l
wheel base	- 2.3 m		
track front	- 1.20 m		
track rear	- 1.22 m		
wheel clearance laden	- .1 m		
payload capacity	- 551 kg; cab takes a 3-man seat		

Comments on Maintenance, Productivity, "Appropriateness," etc.: It is capable of easy conversion to an owner's specific needs; since it utilizes Vauxhall mechanicals (i.e., engine, transmission, drive line, etc.), in conjunction with locally fabricated sheet metal and local assembly, all mechanical components are proven in quality and reliability to the extent that they have been common to vehicles in the current Bedford range; distributorships have expanded to include some twenty countries in Africa, the Far East, Central and South America since the vehicle was introduced in Malaysia, Portugal, Ecuador, and the Phillipines in 1973.

Cost and Present Status (as of 4/25/77): Distributed in over twenty countries in an approximate range of US \$3,100-3,600; in some small markets, it is possible to economically produce less than 200 units a year.

Singha Siam

Siam Motors Co., Ltd.  
865 Rama 1 Road  
Bangkok  
Thailand  
Telephone: 2529830  
Cable: Siam Bangkok  
Telex: Siam TH2655



Description: Gasoline, water cooled, 4-cycle, overhead valve, 4 cylinder, 77 hp Datsun engine; 4 speed column shift; recirculating ball steering; dual circuit hydraulic brake system.

Specifications

weight	-	960 kg	engine	-	77 hp
length	-	4.28 m	speed	-	max. 120 km/hr
width	-	1.54 m	fuel capacity	-	45 l
height	-	1.64 m			
wheel base	-	2.54 m			
payload					
capacity	-	1000 kg			

Comments on Maintenance, Productivity, "Appropriateness," etc.: Designed for transportation of goods, passengers, etc., in rural areas and on construction sites; assembled locally with a body that can be modified into cargo truck or mini bus.

Cost and Present Status (as of 3/78): Sales only in local market at a retail price of US\$3,750.

Also Available: Datsun 1200 AX mini truck - 69 hp engine; production has just begun and is around 40 units per month; retail price - US\$3,600.

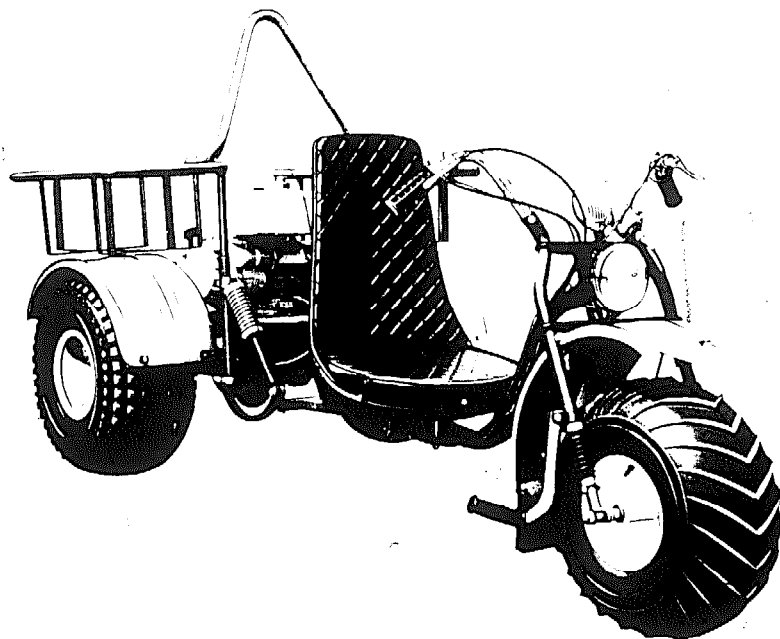
4. TRANSPORT VEHICLES: ON/OFF ROAD GOODS AND PEOPLE CARRIERS  
(ALL-TERRAIN VEHICLES)

The nine vehicles included in this section are designed to operate under difficult ground and climatic conditions. Most carry only one or two passengers and a half ton load. Engines range from 7.5 hp to 35 hp. Prices vary from US\$280-480 for a three-wheeled, 8 hp trail bike that comes in kit form, to a 28 hp cross-country carrier (payload capacity up to 1,830 kg) for US\$6,000.

While none of these vehicles were specifically designed for use in developing countries, several are presently either in limited use or being tested in these countries. All the vehicles are built to withstand and negotiate marshy or rough terrain and inclines.

SST-821 Super Tryke

Heald, Inc.  
P.O. Box 1148  
Benton Harbor, Michigan 49022  
USA  
Telephone: 616-927-1366



Description: 8 hp, Tecumseh 4-cycle engine; transmission - Comet Torque converter; frame type-single member, right angle pivot attached to rear frame assembly with spring damped shocks; hand operated band type brakes.

Specifications:

weight	- 114 kg	engine	- 8 HP
length	- 2.0 m	speed--maximum	- 65km/hr
width	- 1.2 m	fuel capacity	- 4.5 l
height (at handle bars)	- 1.0 m	fuel consumption	- 10.6km/l
wheel base	- 1.4 m		
ground clearance	- 15 cm		
payload capacity	- 2 passengers if double seat ordered or a total load of 275 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Every part comes ready to assemble in a kit - by following the step-by-step instruction sheet the machine can be assembled in 6 to 12 hours using normal tools.

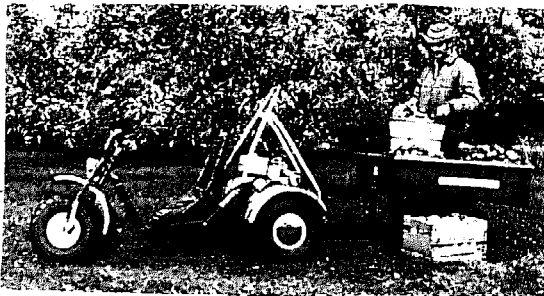
Cost and Present Status (as of 7/6/77): SST-821 Super Tryke - US \$540.60

Also available:

Price Range (US\$)

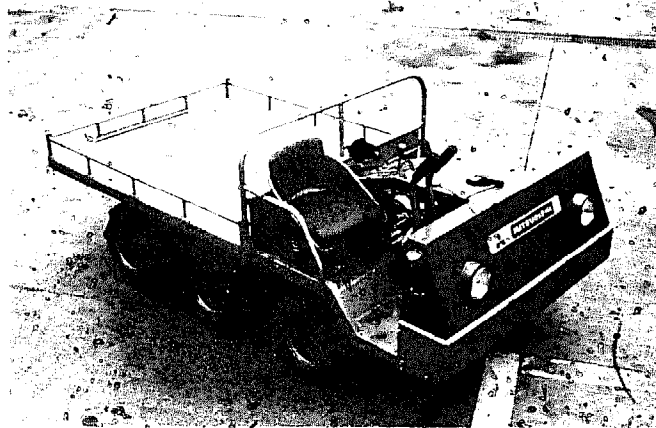
5 HP & 8 HP Trail Bikes	\$279.95 - \$479.95
10 HP & 20 HP Trykes	\$659.95 - \$699.95
10 HP Tractor	\$699.95
Dump Cart (300 kg payload)	\$179.95
8 HP & 10 HP Trucks	\$999.95 - \$1,099.95

total load capacity - 365 kg  
payload - 227 kg  
bedsize - 1.1 m x 1.0 m x .3 m  
(also electric model powered by three,  
12 volt batteries available 9/77)



All-Terrain Vehicle - Model AT 52

Mitsubishi Heavy Industries Ltd.  
Engine & Equipment Division  
5-1 Marunouchi 2-chome, Chiyoda-ku  
Tokyo, Japan  
Telephone: Tokyo (312) 3111  
Telex: J22282, J22443  
Cable: Hishiju Tokyo



Description: Air cooled, 2 cylinder 18-26 HP diesel engine; haul; rectangular tubular steel frame with heavy front bumper plate; 4-speed constant mesh transmission with 3 forward and 1 reverse gear; dry single plate clutch; independent disc brakes on rear wheels; 3-point hitch; hydraulic system; rear P.T.O. and tool bar (optional).

Specifications.

weight	- 390 kg	engine	- 7.5 HP
length	- 2.52 m	speed (maximum)	- 14.9 km/h
width	- 1.27 m	fuel capacity	- 16 litres
height	- 1.11 m	fuel consumption	- app. 33l/HP/h
ground clearance	- .2 m		
wheel base	- .58 m x 2		
payload capacity	- 500 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: It is suitable for off-road conditions such as inclined terrain, muddy ground, and sandy soil; low maintenance requirements; feasibility study has been carried out in Malaysia, Brazil, Guatemala, and Philippines.



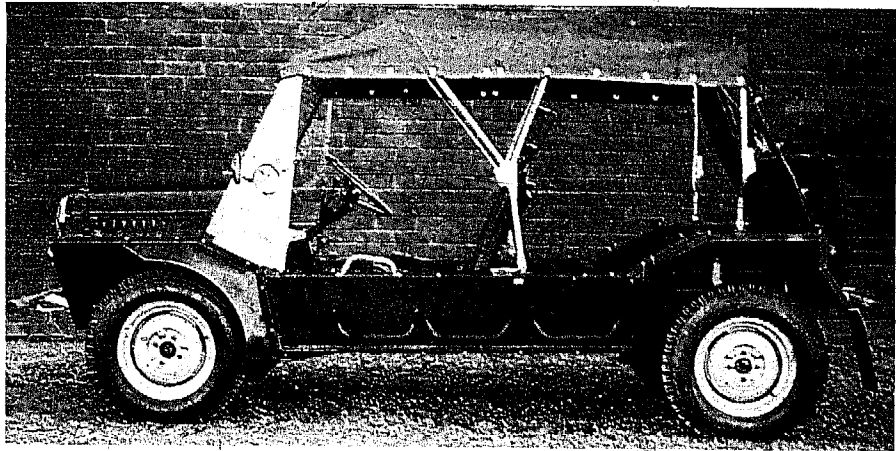
Cost and Present Status (as of 8/79): Model AT 52 - US\$2,500, FOB Japan; annual production is 2,500 units.

Also Available: Model AT 81A (8 wheel drive all terrain vehicle with 11 HP engine and payload capacity of 1000 kg) - US\$3,500, FOB Japan.



Leyland Moke

Leyland Australia  
Box 346 PO  
Bondi Junction  
NSW 2022  
Australia.  
Telephone: 387-0233  
Cables: LEYAUST  
Telex: 20222



Description: All steel welded buckboard; four cylinder, OHV engine; single plate clutch - hydraulically operated; four forward speeds and one reverse speed; hydraulic brakes; rack and pinion steering; suspension-cone springs and tubular shock absorbers.

Specifications

weight	- 998 kg	engine	- 998 cc.
length	- 3.23 m	speed	- 7.6 km/h. to 26.9 km/h
width	- 1.45 m	fuel capacity	- 27 l
ground clearance	- .20 m	fuel consumption	- 15 km per litre
height	- 1.60 m		
wheelbase	- 2.09 m		
maximum vehicle load	- 240 kg		
maximum towing weight	- 400 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Light on/off road passenger and goods vehicle that negotiates rough terrain due to large wheels (325 mm) and high ground clearance (200 mm); may be purchased fully assembled, partially assembled, or fully knocked down.

Cost and Present Status (as of 1/78): ) : FOB Sydney, Australia:

Fully assembled (1-9 units) - app US\$2,500

Partially to fully knocked-down (1-9 units) - app. US\$2,273-2,388

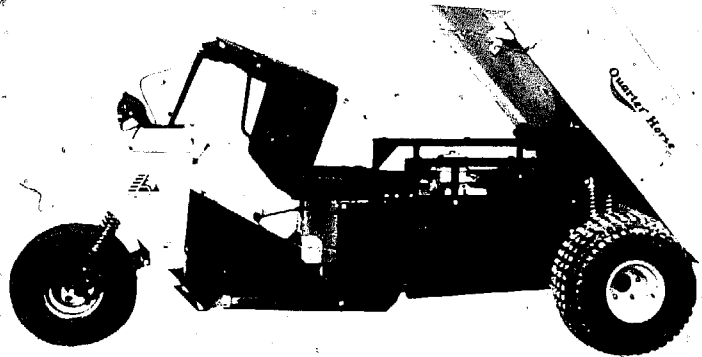
Slight reduction in prices for purchase of larger batches of vehicles.



QUARTER HORSE - QH-14 / QH-10

Promark Products Corporation  
of Ohio, Inc.

P.O. Box 738  
Norwalk, Ohio 44857  
419/668-3721



Description: 10 HP Briggs & Stratton or 14 HP Kohler, 4 cycle - cast iron industrial engine; automatic transmission, "torque sensitive" type; gear driven, completely sealed "Transaxle" differential with forward and reverse transmission; independent suspension (all wheels with adjustable double shocks); hydraulic disc brakes (self-aligning); wide oval flotation tires; dump bed - standard (in 2 sizes - easily removed); hitchplate - standard (takes most standard tow-behind accessories).

Specifications

Weight	-	333 kg	Engine	-	10 HP or 14 HP
Length	-	2.8 m	Speed	-	19.3 - 38.6 k/h
Width	-	1.4 m	Fuel Capacity	-	12.3 litres
Ground Clearance	-	12.8 cm	Fuel Consumption	-	17 km/l
Dump Bed Size	-	31 cu m			
Payload Capacity	-	225 kg and 2 passengers			

Comments on Maintenance, Productivity, "Appropriateness," etc.: Was designed and built for the agricultural market but performs equally as well as a grounds maintenance or industrial vehicle; can do almost any light job on a farm - such as checking irrigation systems, transporting milk, fogging insects, hauling, fertilizer, dirt, firewood, water, people, tools; can perform under muddy conditions.

Cost and Present Status (as of 11/1/77):

QH14 - US\$ 2,599.00  
QH10 - US\$ 2,299.00

Implements:

12.3 Liter Auxiliary Gas Tank - US\$ 41.95  
Utility Blade (Manual Lift) - US\$199.95  
Cab (Fibreglass with doors) - US\$650.00



Terra VW

Terra Sales & Service Ltd.  
Ferguson Place  
P.O. Box 1430, Rotorua  
New Zealand  
Telephone: 82-012



Description: Engine, transmission, suspension, steering and brakes from Volkswagen 1200 saloon; frame and body built up from angle iron welded into safety-cage unit; all-independent torsion bar suspension.

Specifications

weight	-	engine	-
length	-	speed	- up to 88 km/h
width	-	fuel capacity	-
height	-	fuel consumption	- 9 km/l to 11 km/l
wheel base	-		
ground clearance	-		
load capacity	- 300 kg		
pick-up tray			
dimensions	- 133 cm x 108 cm x 33 cm		

Comments on Maintenance, Productivity, "Appropriateness," etc: Used by farmers, surveyors, and works operators in various parts of New Zealand; designed for off-the-road conditions; uses standard Volkswagen basic components; power unit is mounted close to the rear driving wheels, giving traction over rough ground, wet grass, mud, and firm sand.

Cost and Present Status (as of 10/77): US\$2,660.

Workmaster

TORO  
8111 Lyndale Avenue South  
Minneapolis, Minnesota 55420  
Telephone : (612) 888.8801  
Telex/Cable: 29.0463



Description: Two wheel drive, three wheeled vehicle for hauling goods and people; two passenger seating capacity with a Kohler Model K3215 air-cooled, 4 cycle, 14 hp, gasoline engine; hydrostatic variable speed transmission, single foot pedal for instant forward and reverse; 12 volt battery; trailer hitch in rear, steel construction box, 1.15 m long, .875 m wide, and .25 m deep; hydraulic drum brakes on the rear wheels, mechanical parking brake.

Specifications

weight	- 436 kg (empty)	engine	- 14 hp.
length	- 2.69 m	speed	- 0-24.15 km/h
width	- 1.45 m	fuel capacity	- 23.5 liters
height	- 1.17 m	fuel consumption	-
wheel base	- 1.93 m		
ground clearance	- 0.08 m		
payload	- 454.1 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Short turning radius (3.35 m), travels over a variety of terrains; standard size box carries existing engine driven top dressers, sprayers, mowers, and other maintenance equipment.

Cost and Present Status (as of 9/77): US\$3,148.

Passé Par Tout (P.P.T.)

Valquentin Industries, Ltd.  
13204-126 Avenue  
Edmonton, Alberta,  
Canada T5L 3E1  
Telephone: (403) 454-6862



Description: Lightweight, twin tracked industrial tractor, available with Kohler 4 cycle, 16 hp, 1 cylinder engine, splash lube system or Onan 4 cycle, 16.5 hp, 2 cylinder, pressurized lubrication engine; excellent for off-road personnel carrier or small tractor for inaccessible areas; pedal and parking brakes, 2 forward speeds and one reverse, drawbar pulls 2204 kg.

Specifications

weight	- 474.6 kg	engine	- 16 or/16.5 hp
length	- 2.44 m	speed	- 0-32.2 km/hr.
width	- 1.21 m	fuel capacity	- 15.15 litres
height	- 0.62 m	fuel consumption	- 1.97 l/h under load
wheel base	-		
ground clearance	- 0.27 m		
payload	- 454.1 kg		

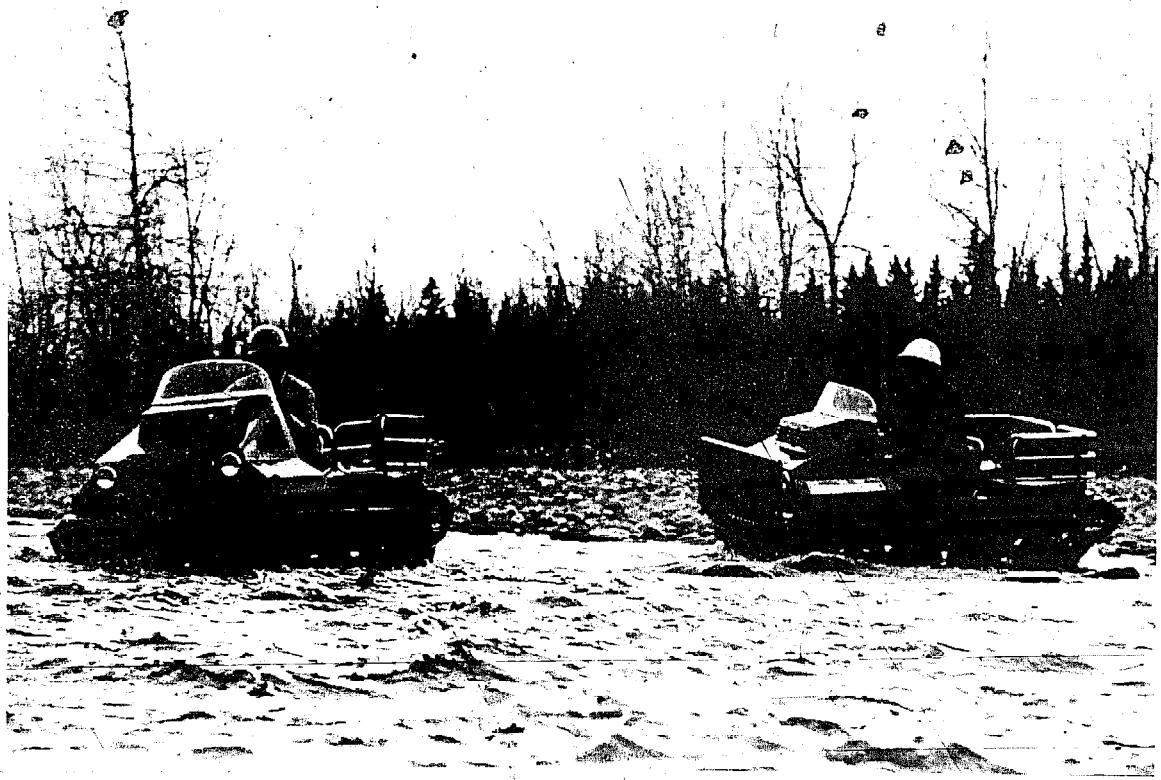
Comments on Maintenance, Productivity, "Appropriateness," etc.: Broad range of applications due to vehicle's size and versatility; track life approx. 5 years. Successfully arctic tested and marketed in many countries. Range of implements and optionals include Safari Cabs, 1361 kg winch, and several smaller winches; also works well as personnel carrier over swamp etc.; helicopter and pickup truck transportable.

Cost and Present Status (as of 2/78): Model 500-16h.p. Kohler engine  
US\$4,699.75

Model 520-16h.p. Onan engine /Roll Bar &  
US\$5,161.75 aluminum firewall only

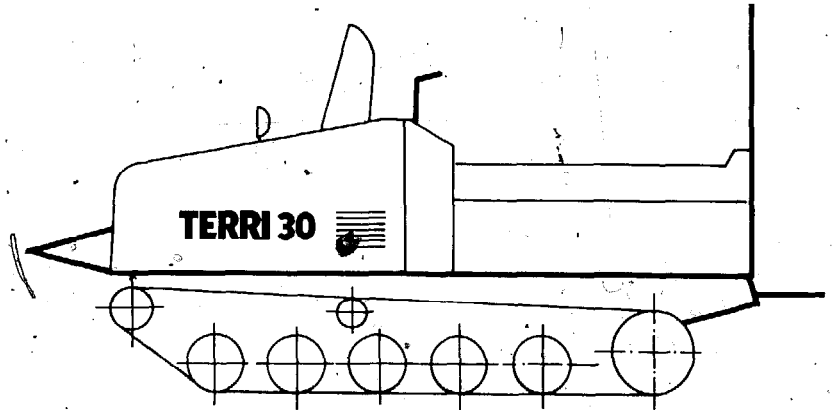
Roll-bars, Safari Cab, Grille guard, winch, etc. vary from \$200.00-\$500.00





Terri 30

Velsa Oy  
61300 Kurikka  
Finland  
Telephone: 964-52100  
Telex/Cable: 72-139/Velsa



Description: A track-driven work and transport vehicle: 2-cylinder, 2-stroke air-cooled 35 H.P. gasoline Kohler engine; electric and manual starting device; transmission-gear box with two forward speed ranges and reverse; mechanical disk brakes; steering and control are done equally simply by means of a steering rod and hand-accelerator; has a frame-mounted winch.

Specifications:

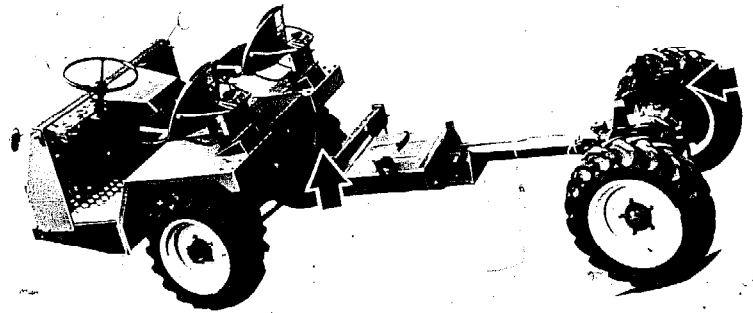
weight	- 550 kg	engine	35 HP
length	- 2.8 m	speed	- 3km/h. to 40km/h
width	- 1.4 m	fuel capacity	- 21 litres
height (with protective frame)	- 1.4 m	fuel consumption	- 6-7 l/h
track	- .5 m		
payload capacity	- one passenger		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Can work in the most varied types of terrain-both in winter and in summer-such as uncleared forest country, marshy bogs, deep snow or water-covered ice; suitable for most demanding transportation tasks of forest management i.e. transporting felled trees to the roadside, forest fertilization, transporting seedlings, clearing roads in winter and for inspection trips of power lines etc. in inaccessible locations; exerting only a pressure of about 30g/cm<sup>2</sup> against the ground means it can be used in bogs and quagmires where other machines cannot go.

Cost and Present Status (as of 7/77): Terri 30-US \$5,000

Bucher Transporter - 1500

Bucher-Guyer Ltd.,  
Engineering Works  
8166 Niederweningen  
Zurich, Switzerland  
Telephone: 01-856 03 22  
Telex: 53199 bgnwg ch



Description: Transporter (cross-country carrier) with many practical combinations for pulling, powering, transporting and working; 4 wheel drive whereby the front wheel drive can be disengaged and a differential lock in the rear axle; 4 cylinder air-cooled 28 HP Lombardini diesel engine; transmission - 6 forward speeds and 2 reverse; auxiliary P.T.O. drive; dual circuit hydraulic brakes on all 4 wheels.

Specifications

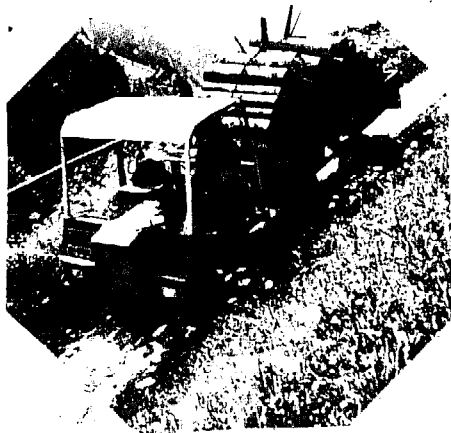
weight	- 1070 kg	engine	- 28 HP
length (chassis)	- 3.90 m	speed	- 2.8 km/h to 25.4 km/h
width	- 1.50 m	fuel capacity	- 45 litres
height	- 7.32 m	fuel consumption	- 3.5 l/h
ground clearance	- 0.79 m		
wheel base	- 2.40 m		
track	- 1.24 m		
payload capacity	- 1830 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.:

Adaptable to all kinds of tools such as tipping body, self-loading forage box, manure spreader, liquid manure tanks, winch, crane, hydraulic system with 3 pt. hitch, etc.; twisting chassis provides good adhesion in broken terrain and in sandy and swampy conditions; the "Transporter" will climb hills with an incline of 45°; all mechanical components are agriculturally proven and tested in many countries; the engine needs to be serviced normally like any diesel engine; in the gear box and final drives, the oil has to be changed once yearly; there are few wearing parts; production started in the early 60's, and since then, every year necessary technical changes and novelties have been built into the machines.

Cost and Present Status (as of 7/31/77): Transporter 1500 - commercially produced in Switzerland for about US\$6,000.

Also Available: 3 other models including the TR 2500 which has a 40 HP Leyland diesel engine and a payload of 2780 kg and is produced for about US\$8,000.



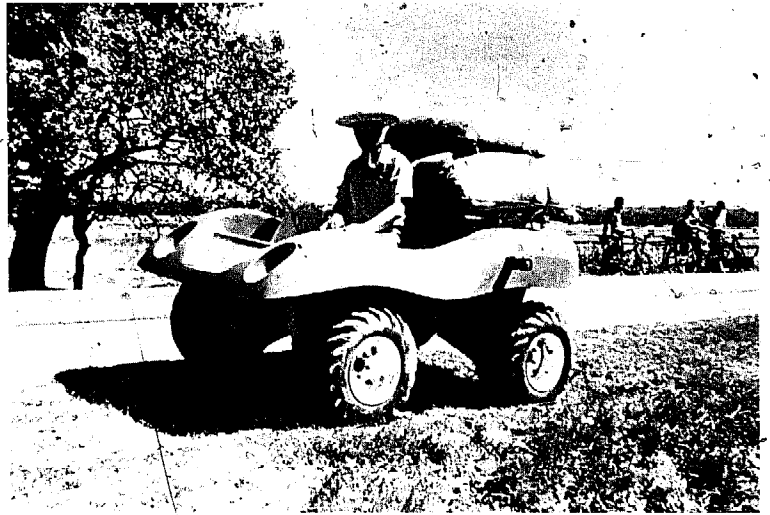
5. MULTI-PURPOSE VEHICLES (AGRICULTURE AND BASIC TRANSPORT)

The eight vehicles in this section range from a simple two-wheeled riding tractor with optional farm implements to a fairly sophisticated small truck which performs a variety of farm tasks. These vehicles all have a broad range of possible uses, from simple road transport tasks to a variety of farm jobs. They vary in cost from US\$1,150 to US\$3,350. Engine power ranges from as low as 8 hp to 75 hp. These vehicles have grade capabilities from 28 degrees to 45 degrees and as much as 9 ton pulling capacity.

Of the vehicles included in this section, three were designed for assembly in developing countries. The remainder are manufactured in the US or Europe. Three of the manufacturers reported use of their vehicles in developing countries.

Small Farm Vehicle

Ray Wijewardene  
Farming Systems Engineer  
I.I.T.A.  
Oyo Road, P.M.B. 5320  
Ibadan, Nigeria  
Telephone: Ibadan 23740  
Cable: TROPFOUND, IKEJA



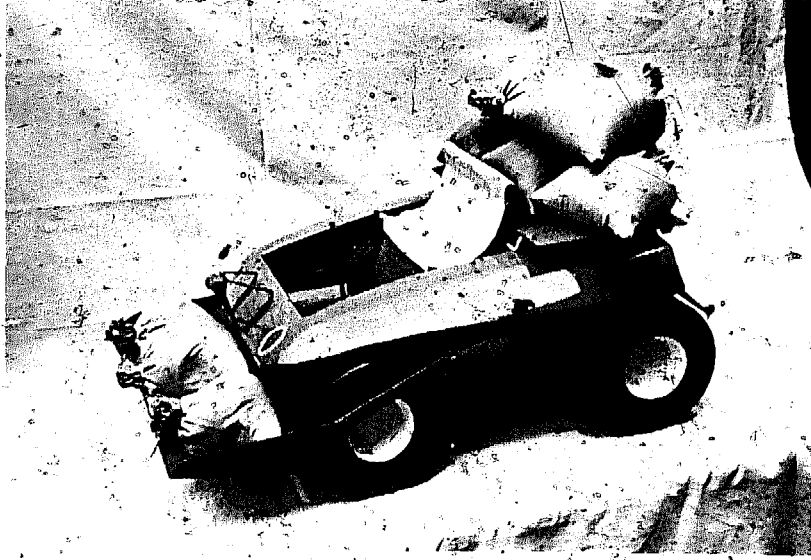
Description: Four-wheel-drive vehicle that can be used as a transport vehicle and also perform agricultural tasks like tilling, mowing, compaction, etc.; 14 HP gasoline engine (another version uses an electric battery); power take-off is available; body is made of plywood.

Specifications

weight - 182-kg engine - 14 HP

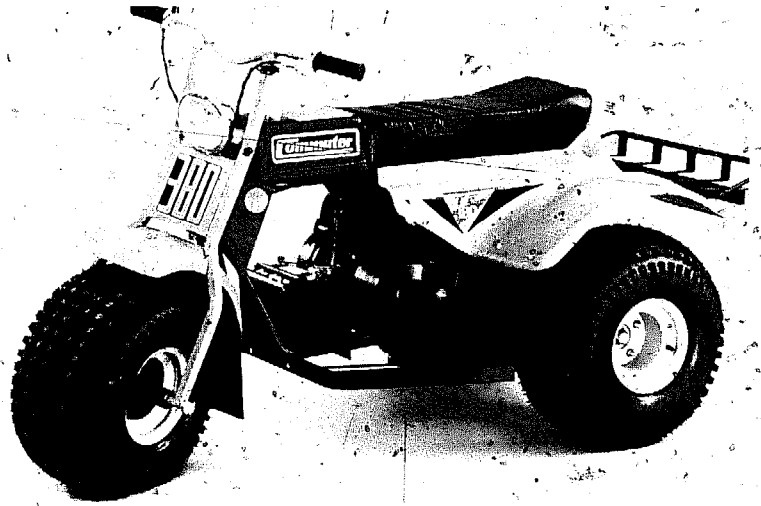
Comments on Maintenance, Productivity, "Appropriateness," etc.: High clearance permits easy off-the-road usage; can work in various off-road conditions such as soft soil by fitting an idler wheel and tracks, and boggy land by installing a third wheel on each side along with tracks.

Cost and Present Status (as of 6/76): Prototype stage; development work abandoned since 1971; US \$1,500 (1970 prices).



COMMUTER TE-380

Commuter Industries Inc.  
Highway 151 East  
Cascade,  
Iowa 52033 U.S.A.  
Telephone: (319) 852.3208



Description: Three wheel, all terrain cycle; 8 hp cast iron Kohler engine; electric start, fourstroke, single cylinder, fan-cooled; transmission, automatic torque converter; final drive-transaxle.

Specifications

weight	- 135 kg	engine	- 8 HP
length	- 2.1 m	speed	- .5km/h to 50 km/h
width	- 1.0 m	fuel capacity	- 6.36 litres,
ground clearance	- .225 m	fuel consumption	- 1.36 l/h
wheel base	- 1.25 m		
height over seat	- .825 m		
height over handle bars	- 1.1 m		
load capacity	- 200 kg		

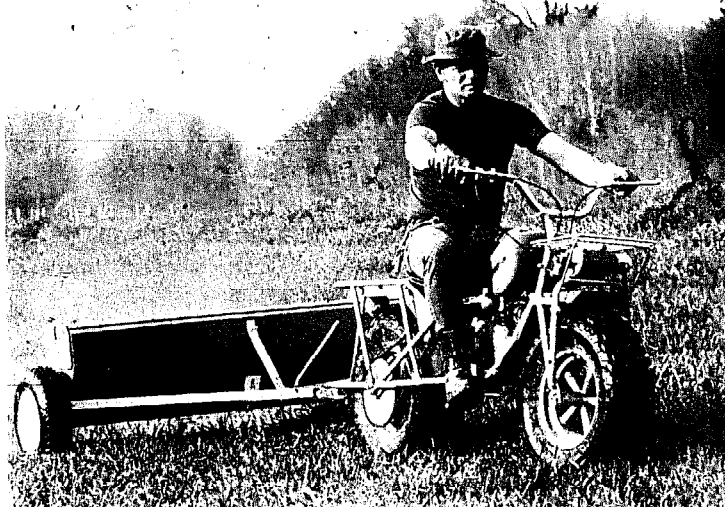
Comments on Maintenance, Productivity, "Appropriateness," etc.: The Commuter with its cast iron engine and transaxle drive is designed to withstand hundreds of hours of trouble free use; the only regular maintenance that must be performed is changing the engine oil and servicing the air cleaner; the Commuter is used for all types of farm work such as crop spraying, irrigation, herding livestock, pulling trailers, etc.

Cost and Present Status (as of 6/1/77): COMMUTER TE-380, Retail, United States  
US\$1,149.00



ROKON MOTOTRACTOR (SCOUT MODEL)

Rokon, Inc.  
160 Emerald Street, Keene  
New Hampshire 03431  
USA  
Telephone: 603-352-7341  
Telex: 928451



Description: Two-wheel drive; 10 hp Chrysler engine - two-stroke, single cylinder, gas and oil mixed, fan-cooled; transmission-automatic torque converter into 3 speed range selector with built in power take off; front and rear disc brakes.

Specifications:

weight	- 93 kg	engine	- 10 HP
length	- 1.88 m	speed	- .8km/h to 65km/h
width	- .77 m	fuel capacity	- 10 litres
ground clearance	- .36 m	fuel consumption	- up to 11km per liter in transport mode; 1.7l/h while ploughing
height over seat	- .74 m		
height over handlebars	- 1.02 m		
fording depth	- .59 m		
wheel base	- 1.25 m		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Its range of implements include all purpose trailer (.34 cu m with a recommended payload of 227 kg), 750 watt alternator, York rake, moldboard plough, double gang harrow, soil cultivator, and attachments for crop spraying and irrigation pumping; over 10,000 models have provided transportation in difficult terrain and conditions over various areas of the world; grade capability - 45 degree slopes; usage of the agricultural implements has just begun in such countries as Indonesia, Colombia, Philippines, Iran, Brazil, New Zealand, and Mexico; using the moldboard plough, the rate of work is approximately 12 $\frac{1}{2}$  hours per hectare; daily maintenance requires lubricating the chains and cleaning the air filter as well as keeping the tires properly inflated; a major overhaul inspection should be made after 1,000 hours; the life expectancy of the tires is 3-5 years.

Cost and Present Status (as of 11/7/77): Rokon Scout-US\$ 1,570.00

Ranger model also available-US \$ 1,675.00. Specifications same as Scout except 25mm higher due to larger implement tires mounted on 17 l. aluminum storage tank wheels.

Implements:

3-Point Hitch 3PH-I	\$175.00
Left Side - PTO Kit PTO-II (for driving peripheral equipment; 7000rpm)	Std. Equip.
Mototractor All Purpose Trailer APT-I (.34 cu m)	
York Rake YR-I	\$260.00
Moldboard Plow MBP8-I (plowing depth: 10-13cm, width of cut: 21 cm)	\$125.00
Double Gang Disc Harrow DH2-I (width of cut: 1.1m, depth of cut: 10cm)	\$140.00 (per gang)
Spreader SP-I	\$162.80
Soil Cultivator SC-I (adjustable depth)	\$150.00
Agri-Fogger AF-I (45 l tank; fogging done at speeds up to 10km/h)	\$435.00
Agri-Sprayer AS-I (225 l tank with horizontal or vertical spray booms)	\$625.00
Rapid Hose Lay Unit RHL-I (manual rewind; capacity: 300m of 1.3-3.8cm hose)	\$395.00
Electric Broadcaster Seeder (34 kg. capacity)	\$125.00
Tri-Trak (3rd wheel Attachment)	\$195.00



Roadmac CUB Transportation Vehicle

Road Machines (India) Private Ltd.  
31 Chittaranjan Avenue  
Calcutta 700 012  
India  
Telephone: 23-0099  
Cable: ROADMACH



Description: Air-cooled, manual start, single cylinder 8.5 hp diesel engine; synchromesh transmission with floor mounted gear lever; two wheel drive; rack and pinion steering; dual circuit hydraulic service brakes.

Specifications

weight	- 895 kg	engine	- 8.5 hp
length	- 2.45 m	speed	- 20 km/h
width	- 1.34 m	fuel consumption	- 1.5 litre/h
height	- 1.42 m		
wheel base	- 1.61 m		
payload capacity	- 1,000 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: An all-purpose machine for construction, agriculture and irrigation work; implements include water pump, plough, small generator, and it can pull a trailer with a 1000 kg payload; chassis constructed with locally fabricated steel and assembled locally; all mechanical components are motor vehicle units; maneuverable in difficult ground conditions and grade capability of 28 degrees; working since its introduction in 1973 in S.E. Asia, Middle East, and India.

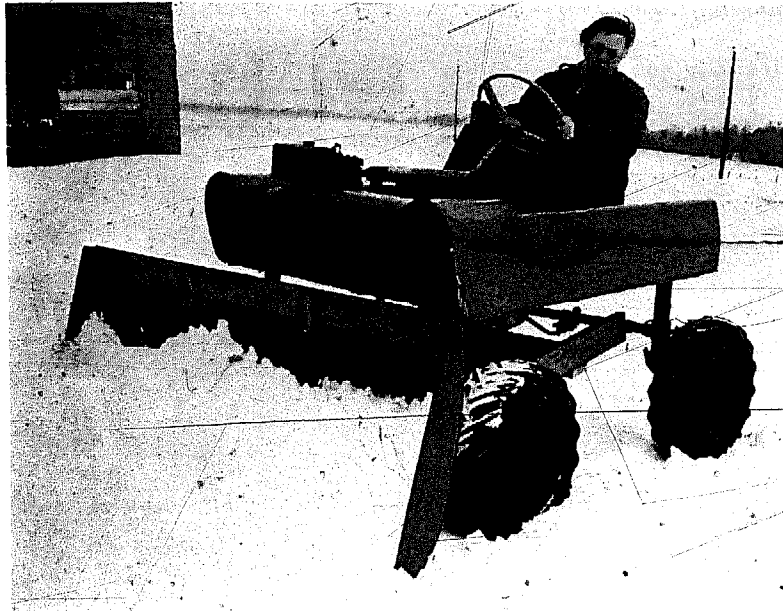
Cost and Present Status (as of 1/78): US\$2,200. Implements vary from US\$100 to US\$900.

Also Available: Roadmac Lioness - 16.5 hp engine, payload of platform tray - 2000 kg; can pull a trailer with a 1365 kg payload: US\$3,000.



## QUADTRACTOR

Traction, Inc.  
Box 90  
N. Troy, Vermont 05859  
USA  
Telephone: (212) 533.4043  
Cable: NYC



Description: 1 cylinder, 4-stroke, 8 hp Briggs and Stratton engine powered tractor; four wheel drive with powered vertical axles; powered suspension system; four wheel cable steering through full 180 degrees; 12 volt electrical system; 72:1 gear reduction, 2 forward 1 reverse gear.

### Specifications

length	- 233.7 cm	engine	- 8 hp
width	- 127.0 cm	speed range	- 0-12.9 km/h
weight	- app. 227 kg.	fuel capacity	- 3.79 litres
height (at back seat)	- 147.3 cm	ground clearance	- 78.8 cm
wheel base	- 157.5 cm		
tread (at outside of tires)	- 157.5 cm		
payload capacity	- 317 kgs carrying app 1 ton pulling		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Under development and testing since 1969, this uniquely designed tractor went into production in early 1978; the vehicle has been designed to maximize traction and minimize weight, thus minimize energy wasted driving the weight of the vehicle itself; flexible steel and alloy frame; vehicle may be lowered up to 17.8 cm on one side to allow efficient functioning on steep side grades; climbs a forward grade of up to 42 degrees; functions in up to 78.8 cm of water, thus appropriate for use in rice paddies; wheel assemblies hermetically sealed; maintenance is simple and requires few tools. A full range of accessories are available from the manufacturer, including a winch plus drawbar equipment (2,000 lb load capability), mower (172.7 cm swath for lawns 213.4 cm for haying), rototiller (91.4 cm swath); plow (25.4 cm x 30.5 cm furrow at 3.22 km/hr standard soil), and logging attachment

which carries up to 2 tons across level ground.

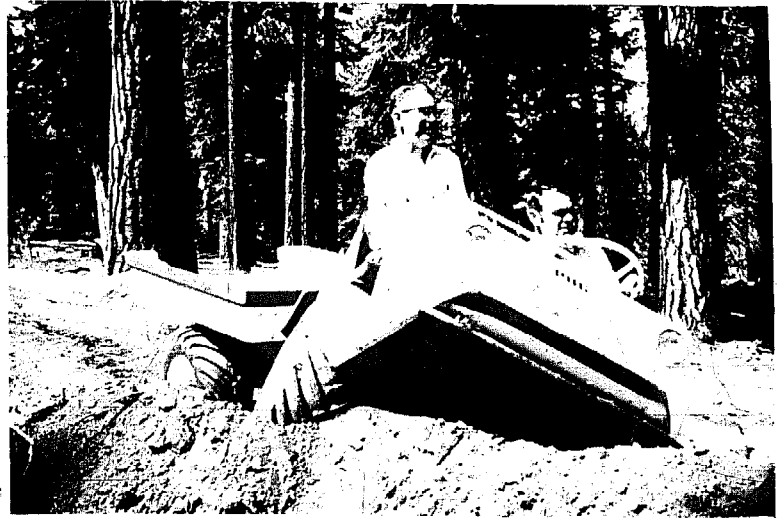
Cost and Present Status (as of 2-1-78):

cost of basic Quadractor - app. US\$ 2,900.00 (F.O.B. East Coast port)  
cost of additional engine to power attachments other than winch - app. US\$200.00  
price of accessories furnished on request.



PUG

Bruce Manufacturing, Inc.  
7450 France Avenue So.  
Minneapolis, Minnesota 55435  
USA  
Telephone: 612-927-4545  
Cable: Pug Minneapolis'



Description: 4-wheel drive utility vehicle for farming, ranching, and a multitude of industrial uses; powered by a 4 cycle, 1 cylinder, air-cooled 16 HP Briggs and Stratton engine which unleashes more torque and power traction per horsepower than any other vehicle now being commercially produced; is constructed with separate front and rear sections with individual differentials and the sections are joined by a special universal joint which permits each body section to twist and turn freely while keeping all four wheels in constant traction with the ground; two-speed automotive type transmission with variable speed torque converter; a hydraulically operated dump body can be easily mounted; automotive type steering sector; hydraulic brakes.

Specifications:

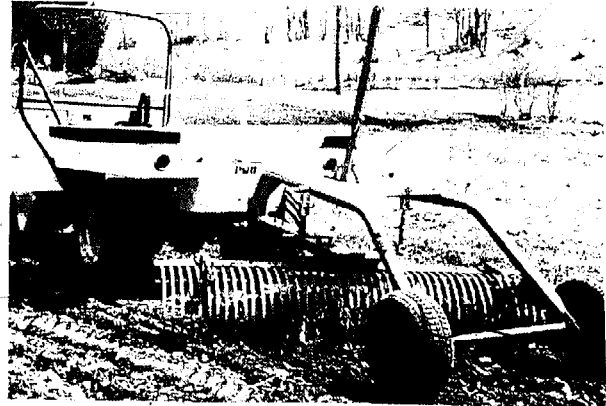
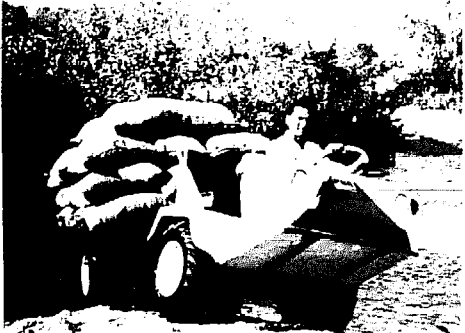
weight	- 455 kg	engine	- 16 HP
length	- 3.56 m	speed--maximum	- 40km/hr
width	- 1.30 m	fuel capacity	- 9.1 l
height	- 1.20 m	fuel consumption	- 1.5 l/h
wheel base	- 1.68 m		
ground clearance	- 20.5 cm		

payload capacity - 909 kg

Comments on Maintenance, Productivity, "Appropriateness," etc.: Climbs 45 degree hills, fords streams and swamps; can carry 909 kg payload over rough and hilly terrain and obstacles; can pull up to 9000 kg; designed for such farm uses as tilling, mowing, hauling, grading, spraying, and fertilizing; as a personnel carrier, has room for 6 adults in rear plus driver and passenger up front.

Cost and Present Status (as of 2/1/77):  
(these are retailed prices; wholesale  
would be approximately 25% less)

4 wheel-drive Pug - US \$2,950  
Hydraulic P.T.O.  
Assembly - US \$ 195  
Grader Blade  
Assembly - US \$ 295  
Draw Bar Hitch - US \$ 6.50





MOTOCHAR XR

Ets LABOURIER & Co  
39330 Mouchard (Juro)  
France  
Telephone: 16 (84) 73.83.14  
          16 (84) 73.80.06  
Telex: 360303



Description: Citroen M 28/1 petrol engine of 28 HP, maximum speed of 25 KM/h; gearbox: 3 forward, 1 reverse; two wheel drive; Rack and pinion steering; the brakes are hydraulic on rear wheels; one man cab or optional 3 man cab.

Specifications :

weight	- 900 kg.	engine	- 28 HP
length	- 2.88	speed	- 25 Km/h
width	- 1.55 m	fuel capacity	- 40 liter
ground clearance	- 0.45 m	fuel consumption	- 7 liter/h
payload of vehicle platform	- 1,365 Kg		
payload of trailer	- 2,273 Kg		

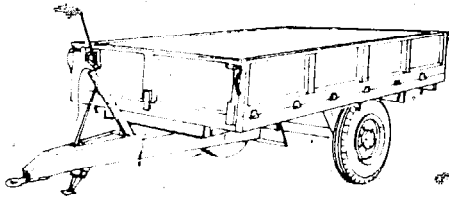
Comments on Maintenance, Productivity, "Appropriateness." etc. The Citroen set (engine, gear box and transmission) is available worldwide; the other mechanical parts are of simple design and are rugged; grade capability : 40% slopes; possible implements : irrigation set, tip wagon, water pump.

Cost and Present Status (as of 4/1/78) : Produced and sold in France since the beginning of 1977 at about US\$3,350.

Cost and Present Status (as of \_\_\_\_\_): TS2210 Tractor US \$  
Also available are models ranging from 13 HP to 35 HP

Implements:

SRL320 Rotary Hoe (standard tilling width-1.3 m)	US \$
Bottom Plow	US \$
Disc Harrow	US \$
Puddling Rake	US \$
Trailer	US \$
Land Leveler	US \$



6. FARM VEHICLES: SINGLE AXLE TRACTORS

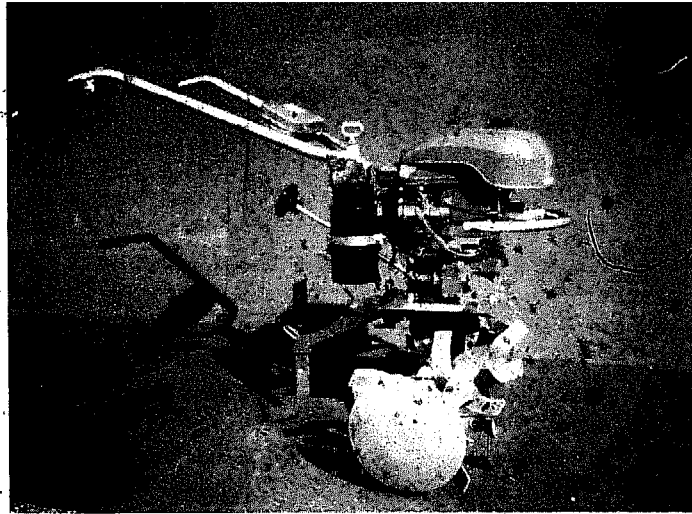
Descriptions of fifteen single axle tractors are included in this section. Prices vary from US\$390 for a very simple 6 hp hand tractor to US\$2,310 for a sophisticated 18- to 21 hp machine.

Single axle tractors are not only used for light farm tasks such as mowing, ploughing, tilling, and pumping water for irrigation, but also in place of draught animals for transport purposes. When attached to small carts, these machines can pull as much as 1,000 to 1,500 kg. Some single axle tractors are designed with removable engines that may be put in vehicle chassis more suited for on-road transport.

The single axle tractors described in this section are manufactured and used throughout the world. All parts save the engine could quite feasibly be fabricated locally in developing countries..

Motozappa S

F. M. di Franceschi &  
Masina s.d.f.  
Via A. Sarti N.4  
Budrio, Bologna  
Italy  
Telephone: 80.11.89



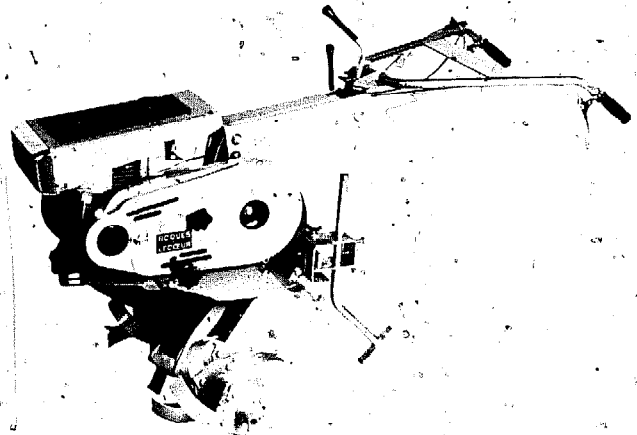
Description: F. B. Minarelli, single cylinder, 6 hp or 7.5 hp, two stroke cycle engine with forced air cooling; gearbox - 3 forward speeds and reverse speed by request; adjustable handle bar.

Specifications

weight	- 90 kg	engine	- 6 hp or 7.5 hp
length	- .90 cm	speed	-
width	- .45 cm	fuel consumption	- 2.3 kg/h
height	- .60 cm		
payload capacity	- 90 kg		

- Comments on Maintenance, Productivity, "Appropriateness," etc: Work width from 10 cm up to 20 cm; power take-off for the application of pumps and cutter bar; designed for olive groves, mountainous cultivations with steep slopes, and gardening; implements include: plough, rubber wheels, iron wheels, trailer.

Cost and Present Status (as of 8/26/77): Commercially produced in Italy at about US\$566 and distributed in Greece, Egypt, Yugoslavia. Several other models available with prices ranging from US\$390 to US\$1,137.



RLX 950 Tiller

Roques & Lecoœur S.A.  
78690 Les Essarts Le Roi, France  
Telephone: 483-92-44  
Telex: 600827

Description: Power pack for multipurpose agricultural work; 4 cycle, one cylinder 5 HP Briggs & Stratton engine (capacity - 205 cc); chain drive transmission - 3 speeds forward and 3 speeds reverse.

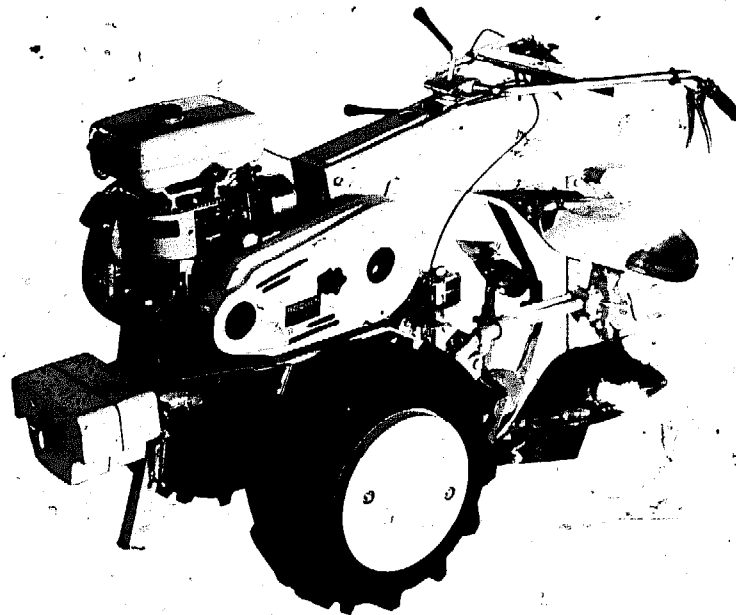
Specifications

weight	- basic power pack - 75 kg.	engine	- 5 HP
	complete with wheels, weights, and 17.9 cm plough - 250 kg	fuel capacity	- 2.4 litres
width	- .85 m (with tiller)	fuel consumption	- 1.11/h
height	- .75 - .80 m		
payload with trailer	- 750 kg.		

Comments on Maintenance, Productivity, "Appropriateness," etc.:

Attachments include plough, tiller, furrower, rake, trailer - easily convertible from one to another; additional accessories include pumps, circular saws, etc; handlebars may be adjusted to suit the size of the user.

Cost and Present Status as of 10/77): RLX 950 Tiller - US\$564.00\*



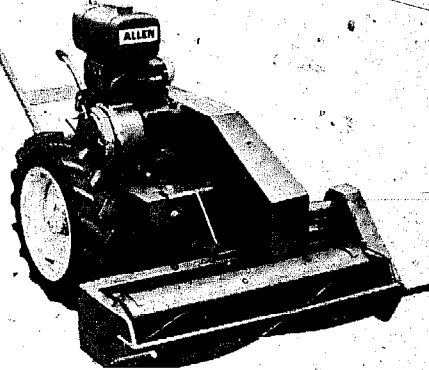
Also Available:

RLX 970 Tiller (7 HP Robin engine, capacity - 250 cc) - US\$819.00\*

\*This price includes no attachments, only the basic power pack.

Allen Mayfield 8

Allen Power Equipment Limited  
The Broadway  
Didcot  
Oxfordshire, OX11 8ES  
England  
Telephone: (0235) 813936  
Telex: 837326



Description: Two wheeled tractor unit with 8 hp, 4 stroke Kohler engine; three forward speeds; recoil starter; adjustable handlebars.

Specifications

weight	- 114 kg	engine	- 8 hp
length	- 1.5 m	speed	- 2.4 k/h to 6.6 km/h
width	- .7 m	fuel capacity	- 5.7 l
height	- 1.1 m	fuel consumption	- 1 l/h
payload capacity			
with trailer	- 600 kg		

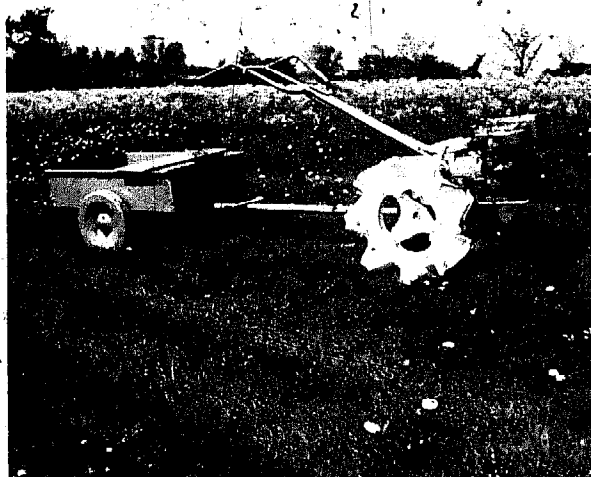
Comments on Maintenance, Productivity, "Appropriateness", etc.: Implements include: 920 mm scythe, 820 mm rotary, 770 mm cylinder mowers, spraying equipment (113 l tank), cultivator, ridger, plough, bulldozer blade, and trailer seat; mowing rate varies from .2 ha/h to .7 ha/h.

Cost and Present Status (as of 8/18/77): Tractor unit: - net export price, US\$810.  
Implements vary from US\$50 to US\$234.



INTEC-77 Tractor

Dowding Tool Products, Inc.  
8950 Narrow Lake Road  
Springport,  
Michigan 49284, U.S.A.  
Telephone: (517) 543-0980



Description: Air-cooled, 4 stroke, single cylinder, 7 HP Briggs & Stratton gasoline engine (diesel option to be offered); cast iron transaxle housing encloses double disc dry clutch, 3 stage gear reduction, and power take-off shaft; hand started; cast iron zig-zag tread wheels; adjustable handlebars.

weight	- 156 kg	engine	- 7 HP
- with wheel weights & dual wheels	- 272 kg	speed	- 2.9 km/h to 4.0 km/h
length	- 1.83 m	fuel capacity	- 3.6 l
width	- .60 m to .71 m	fuel consumption	- 2 l/h
	depending on wheels		
height	- 1.09 m		
wheel base	- 1.95 m		
ground clearance	- .23 m		
payload with cart (65 cm x 100 cm)	- 272 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Farm implements include 19 cm bottom moldboard plow, 8 blade 100 cm disc harrow, 5 sweep toolbar cultivator, middlebuster, rotovator wheels and drag tooth, 1 row planter-fertilizer unit, (irrigation pump under development); maintenance is primarily limited to changing engine oil and cleaning foam air filter every 25 hours; transmission life should average 2000 hours of field use with only periodic checks on oil level; a few easy-to-do daily



service steps are recommended to prolong life of tractor; requires 20 hr/hectare for plowing 15 cm deep and 4 hr/hectare when discing; external tractor parts and implements are rugged and adaptable for local manufacture; 300 tractors of this design have been in use for 5 years in Jamaica and Ecuador; (this tractor was originally designed and sold by Ford Motor Co.)

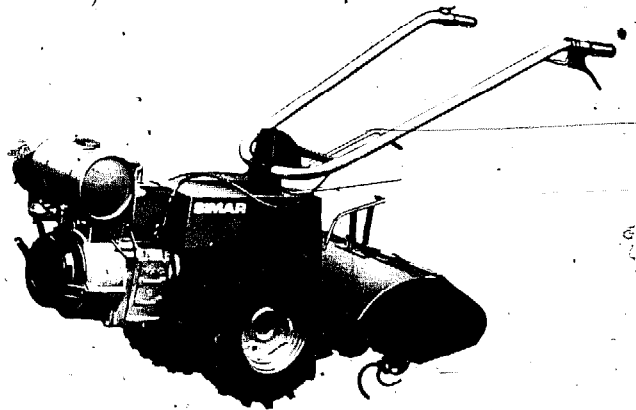
Cost and Present Status (as of 8/77): Currently produced in USA, joint manufacture being considered in Colombia and Jamaica.

Basic tractor	US\$924.00	FOB factory
Plow	US\$ 92.88	
Toolbar implements	US\$155.95	
Disc harrow	US\$ 70.00	
Rotovator package	US\$137.20	
Planter unit	US\$200.00	
Cart	US\$ 95.00	



SIMAR Two-Wheel Tractor - 320 D

SIMAR  
1 Chemin de la Marbrerie  
1227 Carouge  
Geneva, Switzerland  
Telephone: (022) 42-23-66  
Telex: 28-95-91 Sima  
Cable: Simar Geneve



Description: Single axle multipurpose walking tractor with air-cooled, single-cylinder four-stroke 7.5 HP engine; transmission - 4 forward and 5 reverse speeds, all synchronized, entirely mounted on ball bearings with oil seal on all shafts including the power take-off; power take-off rotates in both directions at constant rpm; quick coupling for fast assembly of all implements without tools; on request - recoil starter; handlebars - vertically and laterally adjustable; handlebar and controls - reversible 180 degrees without need of tools.

Specifications

weight	- 100 kg	engine	- 7.5 HP
length	- 1.650 m	speed	- .75 km/h
width	- .58 m		to 8.00 km/h
height	- 1.02-1.60 m	fuel capacity	- 4 litres
wheelbase	- .185-.225 m	fuel consumption	- .7 to 1.2 l/h
ground clearance	- .12 - .22 m		
payload with trailer	- 400 kg		

Comments on Maintenance, Productivity, "Appropriateness", etc.:

More than 18 tested and time-proven implements such as several miller units of different widths and depths (with springs and tines or rigid tools), lawn mowers, front mowers with mulching bar, reversible plough, hoe, potato digger, riding sulky and trailer with riding seat for road transportation; needs little maintenance and has a long life duration; over 50,000 units built since 1918 and a great number of those built before 1940 are still in service. Exported regularly to 15 countries on several continents.

Cost and Present Status (as of 3/1/78):

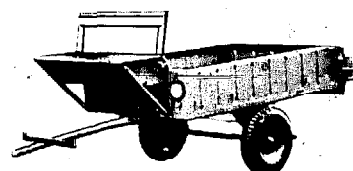
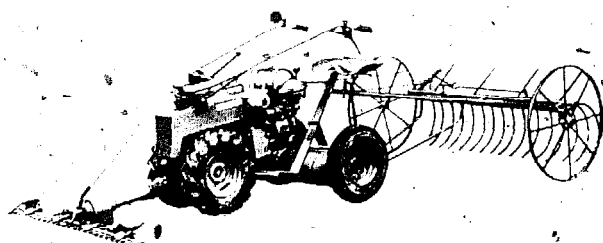
Basic 320 D model - US\$1,150 ex-works.

Implements ranging from US\$100 to US\$600 ex-works.

Also Available:

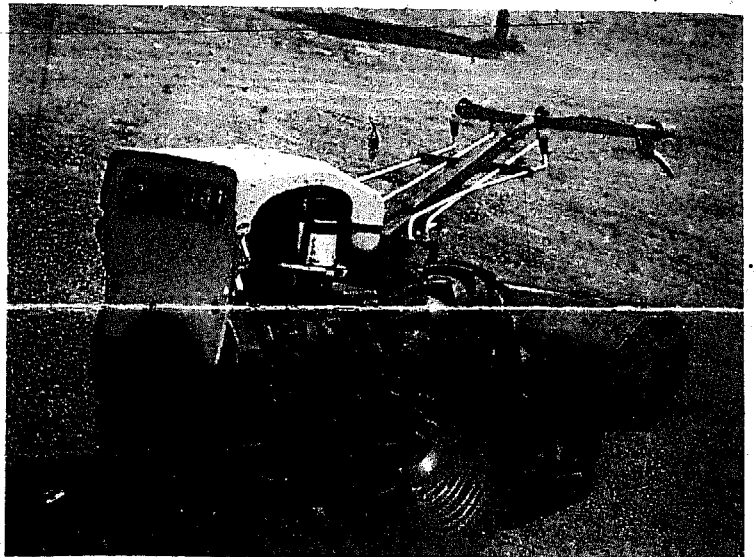
Model 220 - 5 HP engine and weight - 60 kg.

Model 420 - 10 HP engine and weight, - 150 kg.



Pasquali Motorcultivators  
(941 and 946)

Motocultores Pasquali, S.A.  
Poligono Industrial "Can Jordi"  
Calle Haendel, s/n  
Apartado Correos 132  
Barcelona  
Spain  
Telephone: (34-3) 299 09 00  
Cable: MOTOCULTORES



Description: 14 and 18 hp motorcultivators, 1-cylinder, air-cooled, diesel engine; 9 forward speeds, 3 reverse; hand start; may be easily converted to 4-wheel articulated tractor.

Specifications

weight	-	340-350 kg	engine	-	14 and 18 hp
length	-	2.00 m	speed	-	0.6 to 25 km/h
width	-		fuel consumption	-	1.1/hr
height	-	0.85 m	fuel capacity	-	
wheel base	-				
payload capacity	-	1,500 kg (with trailer extension)			

Comments on Maintenance, Productivity, "Appropriateness", etc.: The single-axle cultivators are easily converted to double-axle, articulated tractors, or a double-axle transport vehicle with a heavy duty platform bed; the transport vehicle seats one and pulls up to one and one half tons on a 45° slope; design and conversions are simple, little maintenance required; full range of implements available; exported to 19 countries in Europe, South America, and Africa.

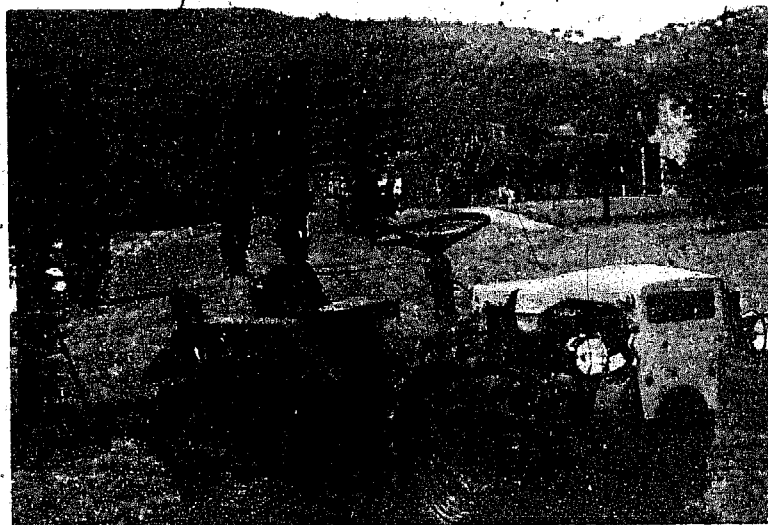
Cost and Present Status (as of 6/77):

14 hp model 941 - US\$1,288 F.O.B.  
18 hp model 946 - US\$1,331 F.O.B.

Also Available: 14 and 18 hp articulated 4-wheel diesel tractors,  
2.20 m long, 1.06 m in height, factory single-axle tractor conversions:

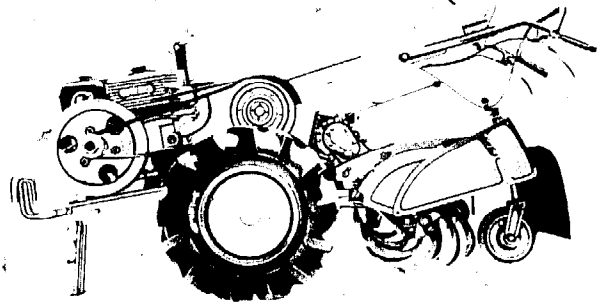
14 hp model 941/603 - US\$2,194 F.O.B.

18 hp model 946/603 - US\$2,237 F.O.B.



Krishi Power Tiller

Krishi Engines Ltd.  
A-7 Unit, Sanatnagar  
Hyderabad-500018  
India  
Telephone: 269306  
Telex: "CARE 015-372 ESTATE"



Description: Model NV-700; center drive rotary, equipped with a 7 HP, water-cooled, 4 stroke, single cylinder diesel engine; tilling width-61 cm; tilling depth-15.2-17.8 cm; number of blades-18; operating speeds-4 forward, 2 reverse; maximum blade speed-240rpm.

Specifications:

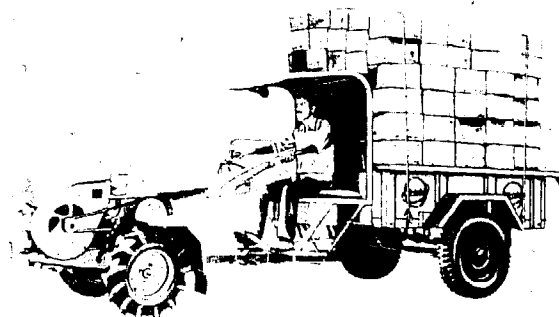
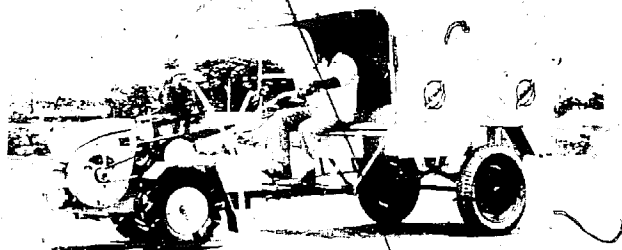
weight	- 340 kg	engine	- 7 HP
length	- 1.85 m	speed	- 1.5km/h to 21km/h
width	- .76 m	fuel capacity	- 6 litres
height	- .99 m	fuel consumption	- 210 gms./B. H.P. Hr.
ground clearance	- .23 m		
payload with trailer	- 1,500 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Equals 4 pairs of bullocks in work output; design incorporates local materials; production and assembly operations are simple to provide easy operation and maintenance without the need for complicated tools and fixtures; expected life is around 10 years; the tiller's effectiveness in puddling operations has resulted in intensive marketing in rice growing areas of neighboring states.

Cost and Present Status (as of 6/30/77): US \$1,300; estimated economic level of production is 600 tillers per annum.

Implements:

- Mouldboard Plow-field capacity is 17-20 hrs/hectare with average depth of 15-20 cm
- Reversible Plow-field capacity is 17-20 hrs/hectare with average depth of 15-18 cm
- Cultivator-field capacity is 7-10 hrs/hectare with average depth of 8 cm
- Disc Harrow-field capacity is 7-10 hrs/hectare with average depth of 8-10 cm after two cross and length-wise operations
- Riding Sulky-field capacity is 5-7 hrs/hectare with effective puddling operation
- Ridger-vee and trapezoidal ridges can be made
- Ferti-Seed Drill-used for sowing crops and application of fertilizer
- Various blades and wheels are available



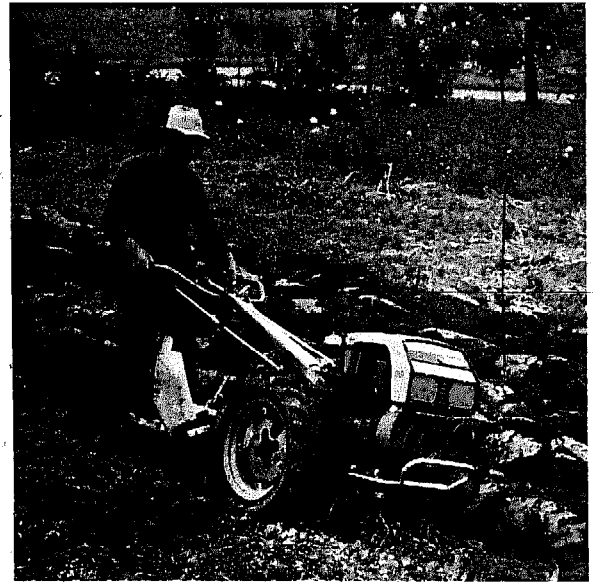
Also available:

Hippo Hauler - US \$1,750

2 wheel trailer attached to the model NV-700 power tiller; various sorts of bodies-high steel walls, wire mesh, canvas covering, or even a 1,500 liter water tank--can be built on the chassis, thus making it adaptable to meet several farmers needs; weight-500 kgs; payload-1,500 kg; speeds-1.5 km/h to 21 km/h; fuel consumption-17 kms/l; ground clearance-22 cm; gradient when fully loaded-1 in 10.

Super Special 130 Motorcultivator

Goldoni S.p.A  
Via Canale 3  
41012 Migliarina di Carpi  
Modena  
Italy  
Telephone: 0522-699240  
Telex: 53023 Goldoni



Description: Single axle motorcultivator with diesel or gasoline, air-cooled 13 hp engine; gearbox - 4 forward and 2 reverse speeds with differential lock; 2 power take-off shafts - one with speeds of 3,000, 1,393, and 740 rpm and the other with 934 and 575 rpm; independent and simultaneous brakes with rubber wheels; rotary tiller width - adjustable to 35, 46, 57, 68 or 80 cms.

Specifications

weight	- 236 kg	engine	- 13 hp
length	- 1.80 m	speed	- 1.37 to 11.19 km/hr
width	- .60 m	fuel capacity	- 5.5 litres
height	- 1.15 m	fuel consumption	- about 180 grs. per hp/hr
payload capacity with trailer	- 1,000 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Its range of implements include: rotary cultivators, trailers with differential, spraying and centrifugal water pump, pulled fibreglass tank, ploughs, side mower, circular saw, and rotary lawn mower; presently being used in Ghana, France, Ecuador, Algeria, Switzerland, Spain, USA, Portugal, Yugoslavia, Greece, Turkey, Tunisia, Libya, Egypt, Jordan, Costa Rica; capacity of work with plough: depth 15/20 cms, width 20/25 cms. 900 sq/mts. per hour; capacity of work with rotary cultivator: width 80 cms, 1,200 sq/mts per hour.

Cost and Present Status (as of 1/23/78):

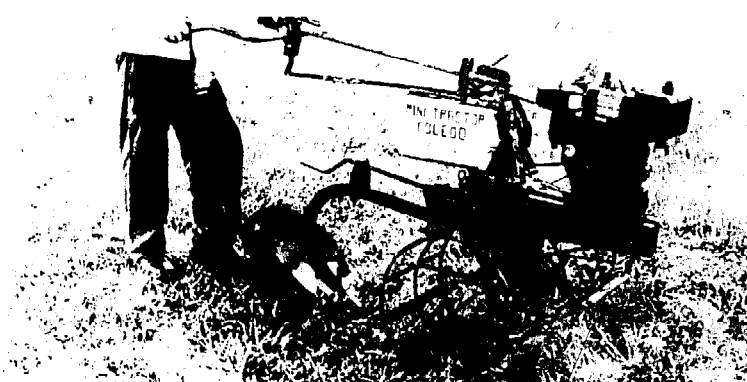
Super Special 130 with rubber wheels - US\$1,351.00.  
Implements vary from US\$37.76 to US\$845.25.





### Toledo Mini-Tractor

Taller Toleda Ltda.  
No. 36-26 Carrera 8a-A  
Cali, Colombia  
Telephone: 401220-441737



Description: 7 HP Briggs & Stratton gasoline engined tiller that performs such operations as plowing, puddling, cultivation, and hauling; is constructed from standard drive components and simple structural sections-four main parts: main frame, transmission, handlebar, & engine; handlebar adjusts forward and back to permit operation with towed implements; to change from field speed to transport speed or vice-versa, the operator simply slips a V-belt from one set of pulleys to another.

#### Specifications:

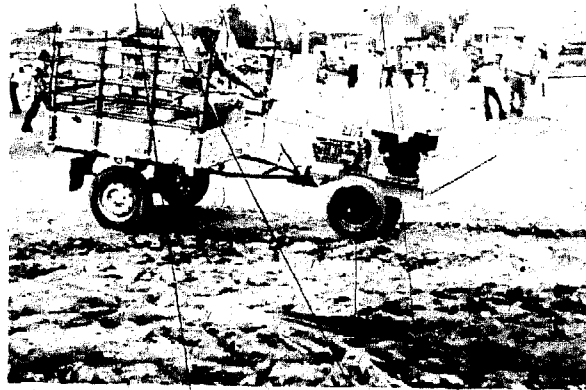
weight	- 112 kg	engine	- 7 HP
length	- 2.0 m	speed (maximum)	- field - 4.3 km/h
width	- 1.2 m		- road - 11.5 km/h
height	- .96 m	fuel capacity	-
		fuel consumption	- 4 l/h

payload of trailer -

#### Comments on Maintenance, Productivity, "Appropriateness," etc.:

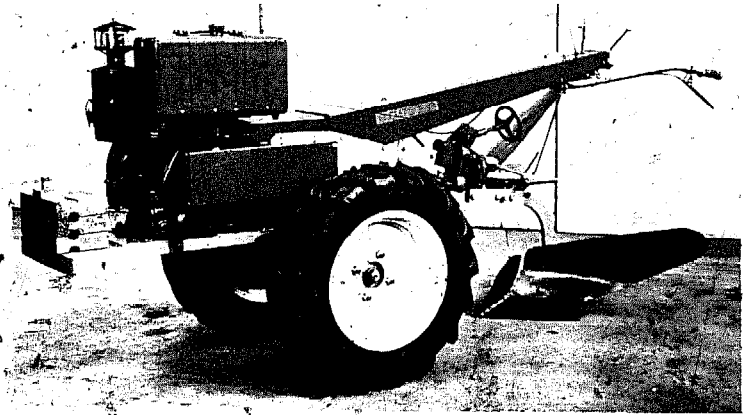
Tiller is lightweight so three men can lift it out if the tiller bogs down; attachments can be changed in seconds without the use of tools; high ground clearance makes it well-suited for wet, muddy fields; constructed according to IRRI (Int'l Rice Research Inst.) design; built mainly from local materials; the solid construction, the sealed bearings and the transmission box results in low maintenance needs; oil in the chaincase lubricates all moving parts; plowing wet soil (one pass) - .5-.8 ha/8hr-day, harrowing flooded soil (one pass) - 1.0 ha/8hr-day; implements include blade, harrow, towbar, turf cutter, pump, heavy-terrain and light-terrain hauling tires, cultivator blades, and weights.

Cost and Present Status (as of 6/20/77): Toledo Mini-Tractor - US \$1,400  
(including trailer)



## TR Tractor

Bouyer S.A.  
Boite Postale No. 7.  
54510, Tomblaine, France  
Telephone: (28) 29-26-62  
Telex: 960484 F



Description: Air-cooled and hand started, one cylinder, 4 stroke engine from 10 to 16 HP; transmission - mechanical gearbox, 6 forward speeds and 3 reverse; 3 independent P.T.O. (260 rpm, 685 rpm, 1590 rpm); vertically adjustable handlebars.

### Specifications

weight (without front and wheel weights)	- 260 kg	engine speed	- up to 16 HP - .48 km/h to 8.61 km/h
length	- 2.32 m		
width	- .60 m	fuel capacity	- 10 litres
height	- .95 m	fuel consumption	- 1 l/h
ground clearance	- .16 m to .25 m under axle, .345 m to .43 m under engine		
payload with trailer	- 1000 kg		

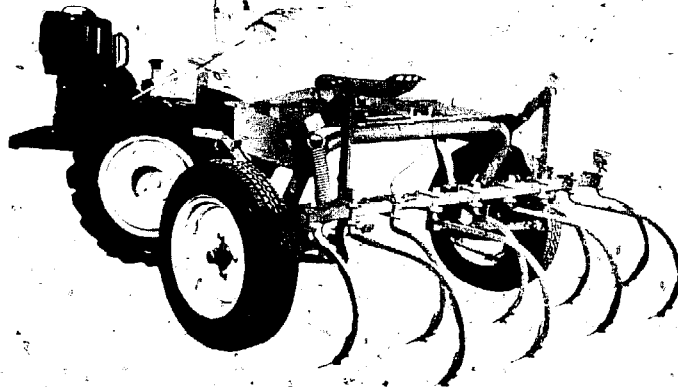
### Comments on Maintenance, Productivity, "Appropriateness," etc.:

Oil regenerator and oil bath air filter specially designed for hot climates; suited for work in dry and wet cultures; range of implements includes 3 types of plough, rotovator with different skids, puddling equipment, tool carrier, ridger, potato harvester, spring tine cultivator, irrigation pump, tipping trailer (with brakes), special spraying equipment, drills, sickle mower, back mower; simple design reduces maintenance and makes eventual repairs easier; sold in Tunisia, Morocco, Ivory Coast, Mali, Niger, Senegal, Upper Volta, Chad, Cameroon, East Africa Community, Nigeria, Egypt.

Cost and Present Status (as of 8/77): TR Tractor - US\$1,550 (ground unit)

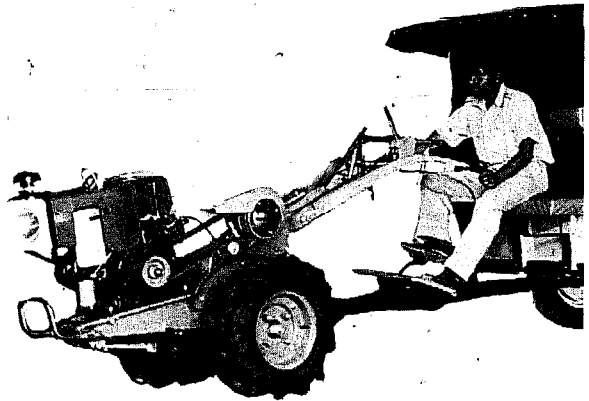
Also Available:

MT 80 Tractor - designed for tropical tilling in small and medium size plots; air-cooled, 4 stroke, one cylinder 8 or 10 HP diesel engine; tractor weight with tropical cultivator - 690 kg; speed - up to 17 km/h.



Mitsubishi Power Tiller CT85

V.S.T. Tillers Tractors Ltd.  
P.B. No. 4801  
Whitefield Road, Mahadevapura P.O.  
Bangalore 560 048, Karnataka State  
India  
Telephone: 58205, 58206, 58207  
Cable: POWERTILER - Bangalore 560048



Description: Two wheeled drive; 8 to 10 hp, air cooled, four stroke single cylinder diesel engine; 6 forward speeds, 2 reverse speeds, 4 rotary speeds; track adjustable between 65 cm to 100 cm; multiple plate dry disc brake - internal expanding metallic shoe type; turning by side dog clutch arrangement; manual start.

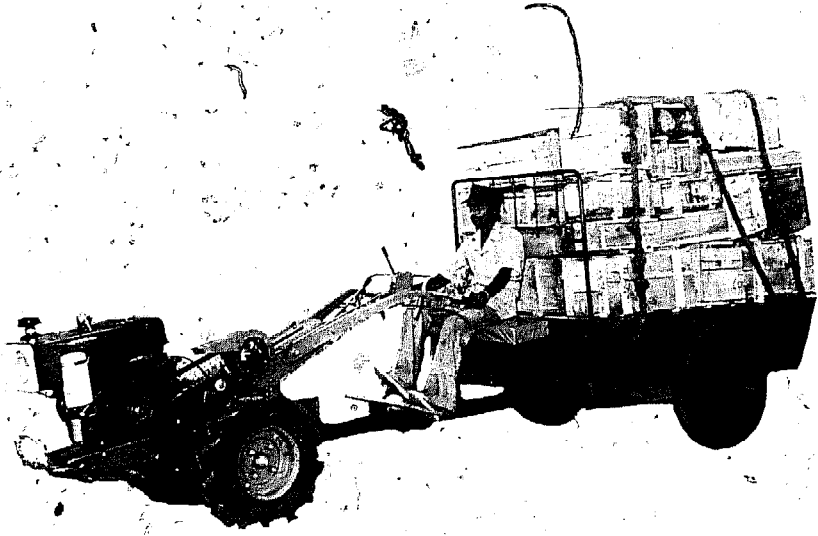
Specifications

weight	- 345 kg	engine	- 8 to 10 hp
length	- 230 cm	speed	- .9 km/h to 22.0 km/h
width	- 67 cm	fuel capacity	- 8 liters
height	- 120 cm	fuel consumption	- between 1.0 to 1.5 l/h
payload capacity with trailer	- 1,500 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc: Range of implements include: rotary with 16 blades, reversible moldboard plough, 5 tine cultivator, furrower, dry land leveller, trailer, high volume sprayer, water pump - 75 mm x 75 mm, grass cutter, ground nut/potato harvester, rotary plough, multi-purpose thresher, auger; multipurpose machine suited for working on small farms and transportation on undulating terrains; designed for use in wet paddy fields with knee deep water and designed to suit tropical conditions; tested extensively at the Government of India Tractor Training and Testing Station, BUDNI; dry rotary tilling - .8 to 1.0 ha/8 hr, wet puddling - up to 1.2 ha/8 hr, ploughing - up to 6 ha/8 hr, pumping - 440 l/m at 1,200 rpm; six to ten times more productive than a pair of bullocks.

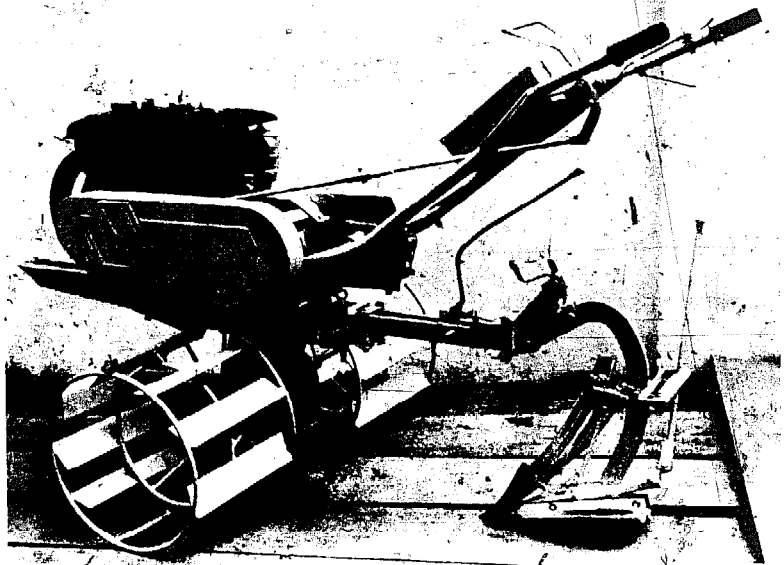
Cost and Present Status (as of 1/9/77):

Mitsubishi Power Tiller CT85 with rotary, US\$1,550.  
Mitsubishi Power Hauler (tiller with trailer) US\$1,850  
Manufactured in collaboration with Mitsubishi Heavy Industries Ltd. of Japan.



Diamond Hand Tractor

Bingkil Muntijul, Jl  
Semarang 62-64  
Surabaya,  
Indonesia  
Telephone: 44273



Description: Hand directed two-wheel tractor, 7 hp Honda engine, choice of gasoline or diesel; cord pull starter; hand-operated fuel lever and clutch for forward and stop only; optional mini trailer unit which may be attached to standard hitch.

Specifications

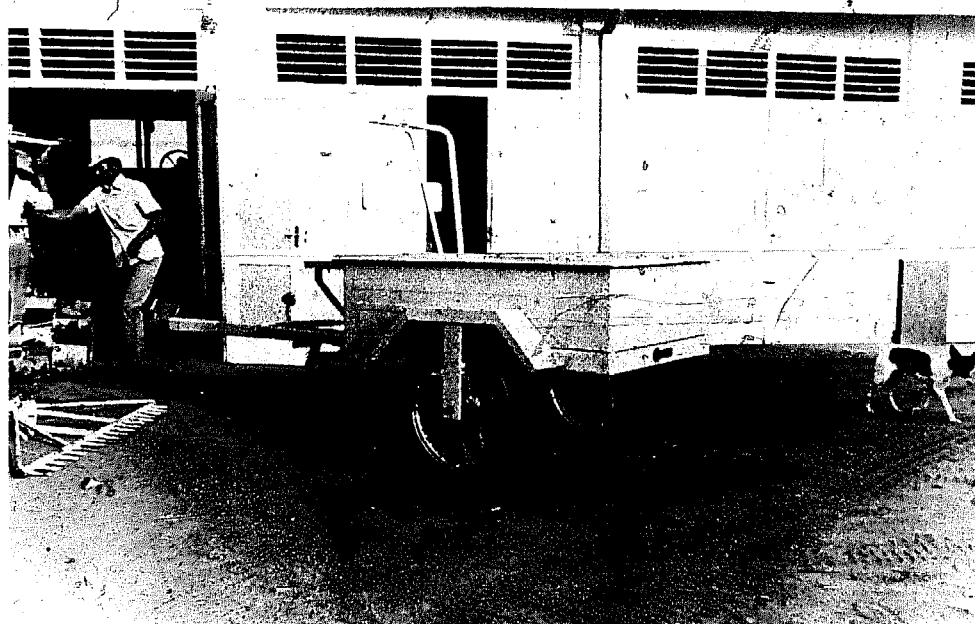
weight	- 126.5 kg	engine	- 7 hp
length	- 2.4 m	speed	-
width	- 1.1 m	fuel capacity	-
height	- 1.32 m	fuel consumption	- 1 litre/hr or 24 litre/ha
wheel base	-		
ground clearance	-		
payload capacity	-		
with trailer	-		

Comments on Maintenance, Productivity, "Appropriateness," etc.: May be attached to specially designed cart for carrying goods or people, attachments include leveling rake and moldboard plow; designed to be appropriate for road conditions in developing countries such as Indonesia; similar to vehicle used in Philippines; with minor modifications for soil and climatic differences.

Cost and Present Status (as of 8/14/77):

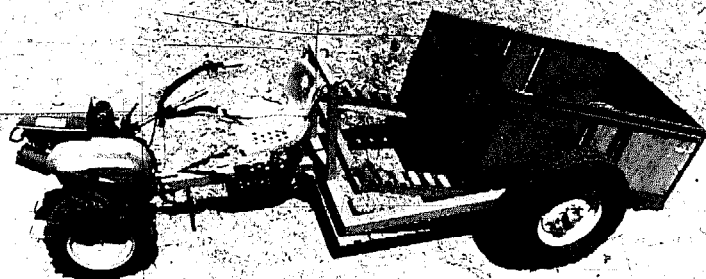
Hand tractor with diesel engine: US\$1619  
Hand tractor with gasoline engine: US\$1143  
Mini trailer: US\$429





Roller Bed Carrier

Ramat David Metal Works  
Post Ramat David 30093, Israel  
Telephone: 065-661111



Description: Single-axle trailer which unloads by sliding pallets and containers rearward on rollers; suitable for many agricultural uses; available in a wide range of weights and sizes:

- weights - from 500 kg to 10,000 kg
- lengths - from 1.60 m to 6.00 m
- widths - from 1.50 m to 3.00 m

The smallest trailers come equipped with a single-axle tractor with a capacity of between 6-24 HP and a speed of up to 10 km/h; the biggest trailers are pulled by standard tractors.

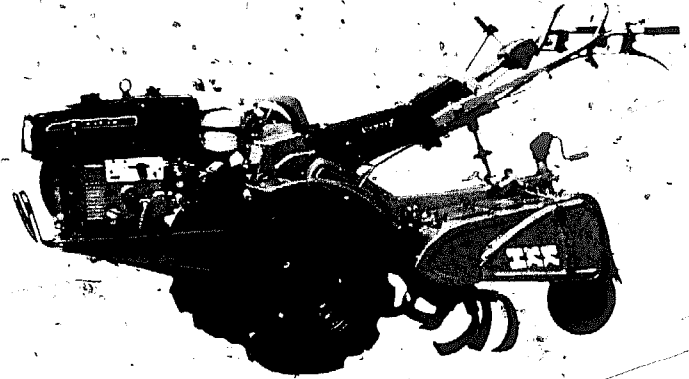
Comments on Maintenance, Productivity, "Appropriateness," etc.:

Maintenance and operation of the single-axle trailer are simple, and the roller bed carrier is also of simple design and construction; the small tractor can perform many other agricultural tasks not related to hauling, and in combination with the roller bed carrier it becomes a versatile and inexpensive low-maintenance farm machine.

Cost and Present Status (as of 8/77): 6 HP single axle tractor with a roller bed carrier which has a payload of 700 kg - US\$1,900.

Suzue Power Tiller - LAC-90

Chuo Boeki Goshi Kaisha  
CeCoCo Agricultural & Small  
Industrial Center  
P.O. Box 8, Ibaraki City  
Osaka, Japan  
Telephone: Ibaraki 0726-22-2441 3  
Cable: CeCoCo Ibaraki



Description: Center drive, equipped with a 8-11 HP water-cooled diesel engine and a rotary hoe set; tilling width-54 to 73 cm; number of tilling blades-18 to 22; speeds-6 forward, 2 reverse and 4 steps for rotary work; the levers of speed change, PTO speed, and clutch are located on the handles.

Specifications:

weight	- 350 kg	engine	- 11 HP
length	- 2.2 m	speed	- (max. speed on the road) 15km/h
width	- .7 m	fuel capacity	-
height	- 1.1 m	fuel consumption	-

payload with trailer - 500 kg

Comments on Maintenance, Productivity, "Appropriateness," etc.: Any engine can be loaded on the engine frame in compliance with the buyer's wishes; handle is adjustable up and down so to agree with a worker's physique; wide range of implements available.

Cost and Present Status (as of 10/77): Suzue Power Tiller LAC-90 US\$2,080  
Also available LEC-50 model tiller (5-7 HP engine) US\$1,800  
(F.O.B. Kobe, Japan)

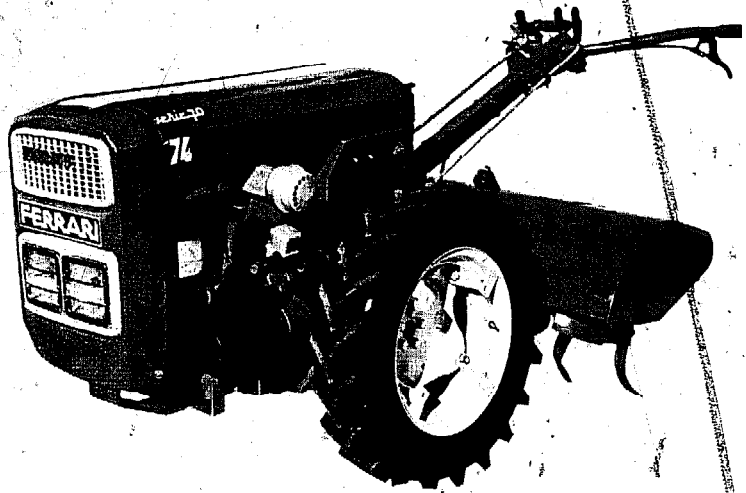
Implements:

Ridger	US \$36
Reversible Plow	US \$84
Trailer with saddle, pneumatic wheel, hitch bar and brake	US \$580
Self-priming centrifugal pump	US \$450



Ferrari 74 Motor Cultivator

Ferrari S.p.A.  
Officine Meccaniche  
42045 Luzzara  
Reggio Emilia  
Italy  
Telephone: (0522) 835113/216  
Telex: 53144 Fermac



Description: Air-cooled, single cylinder, 18-21 hp diesel engine; electric or jerk starting; gearbox - 6 forward and 3 reverse speeds; clutch - dry single plate type; two P.T.O.s - 550-640 rpm and 800-930 rpm, one synchronized for towing trailers with driving wheels; adjustable steering handlebar; variable track - according to type of tire, wheel, and spacer assembly - minimum of 560 mm and maximum of 970 mm; drum type brakes.

Specifications

weight (with tiller) -	430 kg	engine -	18-21 hp.
length	- 2.30 m	speed	- 9 km/h to 15.4 km/h
width (with tiller)	- 1.00 m		
height	- 1.00 m		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Designed to handle a broad range of agricultural and other operations such as ploughing, mowing, irrigating, spraying, towing, etc.; its central articulation makes handling easier.

Cost and Present Status (as of 1/1/78): app. US\$ 2,310.

Several other models available, ranging from 7 to 14 hp.



7. FARM VEHICLES: THREE AND FOUR WHEEL RIDING TRACTORS

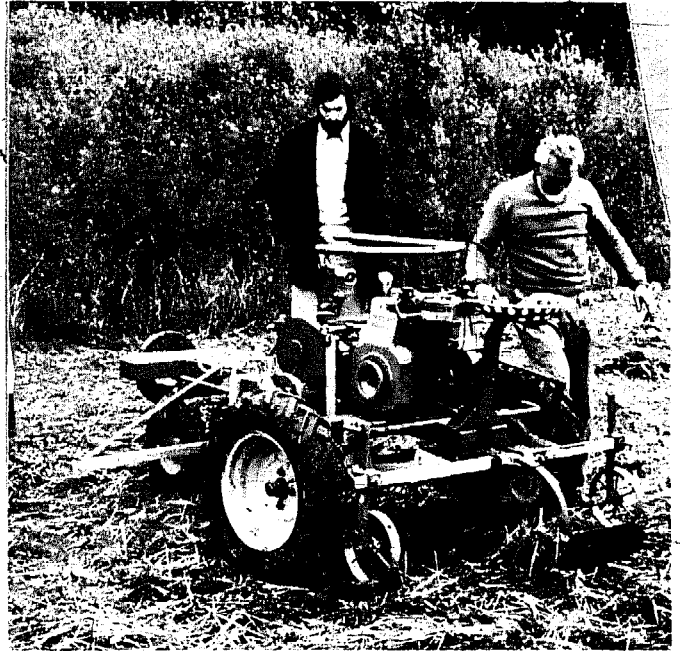
Thirty-one tractors are described in this section. Six are prototype vehicles, currently being tested in developing countries. Five of these could be assembled in local shops using imported mechanical parts and locally fabricated bodies. The remaining twenty-five tractors are manufactured and used throughout the world in both developing and industrialized countries.

The tractors are powered by engines ranging from 7 hp to 30 hp, and are priced from approximately US\$1,500-4,886. Most have a payload capacity of about one half ton, although several models can carry as much as two and one half tons.

While this type of tractor was designed for general farm tasks such as ploughing, tilling, and the like it is often used for off-road transport. The tractors can be easily hitched to a cart for this purpose.

Mouzon-Le Lous Row Crop Tractor

Mouzon  
B.P. 26  
60250 Mouy, France  
Telephone: 456-56-18



Description: 7 to 10 HP engine, either gasoline or diesel; transmission - 3 forward and 3 reverse gears; simplified hydraulic lifting.

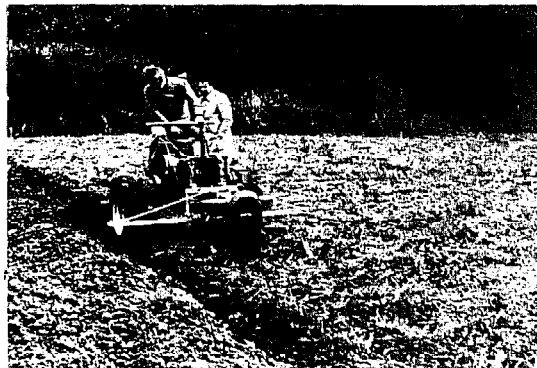
Specifications

weight	-	engine	- up to 10 HP
length	-	speed (ploughing)	- 4 km/h
width	-	fuel capacity	-
height	-	fuel consumption	-
wheel base	-		
ground clearance	- .60 m		
payload with trailer	- 800 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.:

Although power is limited to 10 HP, its weight and mass balance enables it to plough even in hard conditions with a one furrow plough; features all tools necessary for drag-chain tilling; traction power is equivalent to two strong oxen.

Cost and Present Status (as of 8/77): Prototype.





One-Wheel-Drive Tractor

National Institute of Agricultural  
Engineering  
Wrest Park, Silsoe  
Bedford, U.K.  
Telephone : Silsoe (0525) 60000  
Télex/Cable :



Description : Small three-wheel tractor; 2 cylinder, 9.5 hp diesel engine; mechanical transmission.

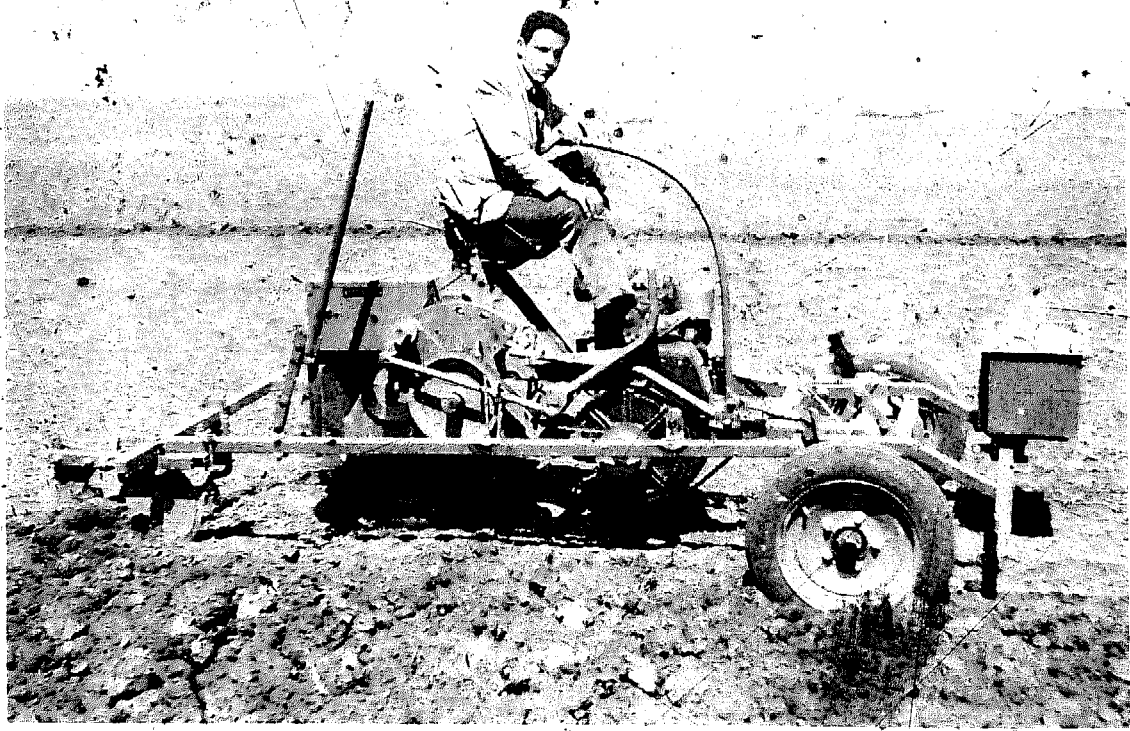
Specifications :

wheel base	- 1.68 m	engine	- 9.5 hp
wheel track	- 1.53 m	speed	- maximum 12 km/h

Comments on Maintenance, Productivity, "Appropriateness," etc.:

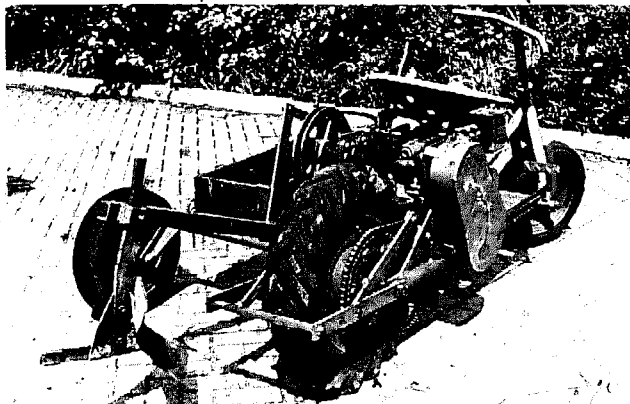
Prototype testing trials were stopped in 1964 because of lack of interest in African countries.

Costs and Present Status (as of \_\_\_\_\_):



### Three Wheel Riding Tractor

Department of Agricultural  
Engineering  
State University of Agriculture  
Mansholtlaan 12  
Wageningen, The Netherlands  
Telephone (08370) 82980/19110/19143



Description: Air-cooled, hand started, 4 stroke, one cylinder 7 HP Briggs & Stratton gasoline engine; transmission - V-belt and chain drives; wheel arrangement results in only 2 tracks; bicycle type of steering; main frame is made of 3.8 cm pipe; speed is changed by transferring the V-belt from one pulley to the other; simple band brake; drawbar behind the driving wheel with a central hole for hitching a trailer.

#### Specifications

weight	- approx. 320 kg	engine	- 7HP
length	- 2.40 m	speed: field operations	- 4 km/h
width	- 1.19 m	transport	- 10 km/h
height	- 1.00 m	fuel capacity	- 3.8 litres
wheel base	- .90 m		
ground clearance	- .335 m		

Comments on Maintenance, Productivity, "Appropriateness," etc.: This tractor was designed to provide a suitable replacement for bullock power in India; implements to be used with this tractor will be improved bullock-drawn implements; engine can be taken out for running stationary machines like a water pump and thresher; can be manufactured in a small smithy and welding shop; engine, tires, bearings, belts, chains and different materials for

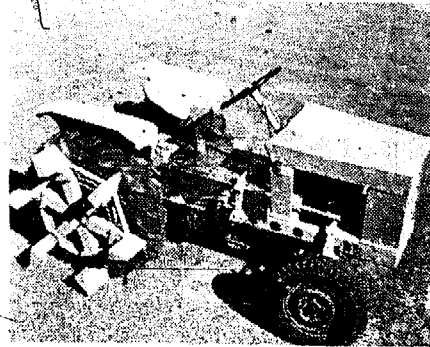
the construction of the tractor are available in India; the major operations in the manufacturing process are cutting, welding and drilling; turning operations are required on two shafts, three axles and housings; construction is very simple and familiar to bicycle repair shops; these shops can open and assemble the tractors without any instructions; the shops are very common in India and can play a major role in the first stage of its popularization; the tractor is designed to replace two pairs of bullocks.

Cost and Present Status (as of 8/77): Prototype; certain improvements have been suggested after which manufacturing could be undertaken.



15-20 HP Tractor

IRRI-PAK Agricultural Machinery Program  
73-A, Satellite Town  
Rawalpindi,  
Pakistan  
Phone: 42193



Description: four-wheel tractor powered by 15 to 20 HP diesel or gasoline engine; requires standard automotive components such as gear transmission, differential, transfer box, steering gear box, wheels and brake assemblies.

Comments on Maintenance, Productivity, "Appropriateness", etc.: The tractor is designed to utilize readily available automotive parts to facilitate local production in developing countries; a prototype tractor with jeep components was recently received from the Philippines; interest in local production is under evaluation.

Cost and Present Status (as of 1/78): prototype

Pangolin CD26

Le Bureau de Developpement  
Industriel  
B.P. 4196  
Abidjan; Ivory Coast  
Telephone: 22-78-81, 32-42-86  
Telex: Burdevi 793 R.C.I.



Description: Air cooled, 26 HP, diesel engine; gear box-axle -- 3 forward synchronized gears and 1 reverse; drive-rollers are sandwich-mounted between the front and rear wheels to provide 4-wheel drive; steering--through 2 levers independently actuating the right or left hand brake, if one brake is applied, both corresponding wheels and their track are blocked; brakes--through fluid master cylinder; suspension--none, the axles are fixed and rigid and no articulation; power take-off--through pulley wheels at back of engine; tracks--articulated, 35mm pins in plastic sleeves (locally made); chassis--self-supporting with 2 safety hoops and rugged sheet metal roof.

Specifications:

weight	- 800 kg	engine	- 26 HP
length	- 1.8 m	speed	- 2km/h to 14km/h
width	- 1.24 m		
height (with roof)	- 1.74 m	fuel capacity	-
wheel base	- .7 m	fuel consumption	-
ground clearance	- .42 m		
track	- 1.0 m		

payload capacity

Comments on Maintenance, Productivity, "Appropriateness," etc.: Constructed by village artisans and can thus be repaired by artisans in remote areas; the engine-gear box is imported, already assembled, from Ets. Jacquet (France), and the chassis, tracks and 6 hubs are made locally; production tasks are limited to simple welding and carpentry and can be performed in a workshop equipped with a reciprocating saw, welding equipment, oxyacetylene cutter, grinding machine, portable drilling tools and hand tools, mixed production is possible with a plant in a major city and small workshops in the rural areas; various implements can be

attached, i.e., single-share plow, twin-share plow, minibulldozer blade (height-.4m and width-1.25m), in the development stage are a small land clearer and a light gyro-crusher.

Cost and Present Status (as of 7/77): Prototype--since work began on the vehicle in January 1974, there have been several improvements to the original design; under the auspices of IDB (Le Bureau de Developpement Industriel), five newly constructed prototypes are being tested at Katiola, Ivory Coast; the testing program is examining different engines, methods of traction, and various agricultural and special implements; these three other models have also been introduced: (1) RD16 (16 HP engine and weight-600 kg), (2) RD26 (26 HP engine and weight-650 kg), and (3) RE28 (28 HP engine and weight-650 kg).



AFCOM Tractor

AFCOM

Route de Vridi  
B.P. 11670  
Abidjan, Ivory Coast  
Telephone:  
Telex/Cable:

Description: 4 stroke, 2 cylinder, air-cooled 15 HP diesel engine; electric start; transmission - 4 forward and 1 reverse gear, speed-reducing gearbox; power take-off - 1500 rpm; hydraulic foot brakes; the front load pan can easily be tilted forward.

Specifications

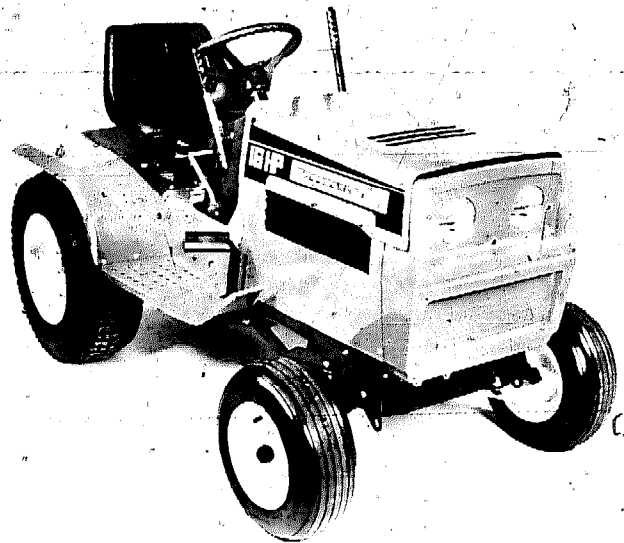
weight (with platform)	- 870 kg	engine	- 15 HP
length	-	speed	- 3.6 km/h to 13.0 km/h
width	-		
height	-	fuel capacity	-
wheel base	- 1.75 m	fuel consumption	-
ground clearance	- .55 m		
payload of front load pan	- 900 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.:

Implements include plough, cultivator, seeder, and trailer; recorded ploughing times: medium ploughing - 6 hr/ha, deep ploughing - 12 hr/ha, weeding - 2 hr/ha, ridging - 3 hr/ha.

Cost and Present Status (as of 8/77): Prototype.





### 16 HP Transaxle Compact Tractor

MTD PRODUCTS INC  
5389 West 130th Street  
Cleveland, Ohio 44111  
Telephone: 216-267-2600  
Telex: 980-635

Description: Air cooled Briggs & Stratton twin cylinder gasoline engine; 12 volt electric battery start with dual circuit alternator; 4 speed cast iron transaxle with automatic over drive--16 speeds forward and 4 speeds reverse; 2000rpm PTO points at front, middle, and rear; adjustable rear wheel spacings; disc brakes.

#### Specifications

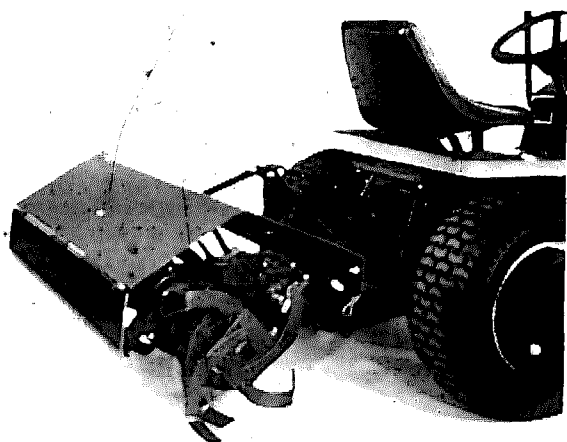
shipping weight	- 386 kg	engine	- 16 HP
length	- 1.82 m	speed	- .8km/h to 17km/h
width	- 1.04 m	fuel capacity	- 13.6 l
height	- 1.09 m	fuel consumption	- heavy load - 3.78 l/h light load - .95 l/h
ground clearance	- 0.20 m		
payload of dump cart	- 450 kg		

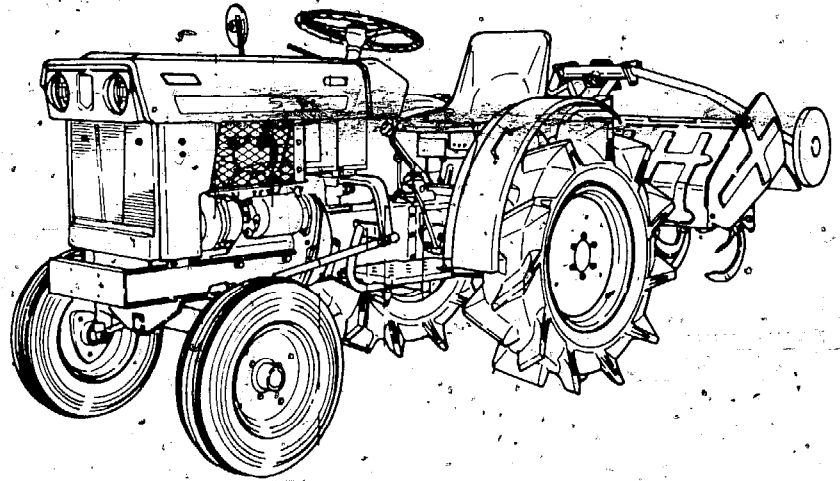
Comments on Maintenance, Productivity, "Appropriateness," etc.:  
Accepts all category "O" type implements; currently being studied for agricultural use on small farms by Nigerian government.

Cost and Present Status (as of 7/77): 16 HP Transaxle- approximately  
US \$1,500.00 F.O.B. Cleveland without attachments.

Implements:

Moldboard Plow (30cm)	US \$ 130.00
Rotary Tiller (102cm)	US \$ 358.00
Tandem Disc Harrow	US \$ 190.00
Cultivator	US \$ 85.00
Angle Dozer Blade (138cm)	US \$ 139.00
Water Pump	US \$ 280.00
Mower (128cm)	US \$ 257.00
Dump Cart (.3 cu m)	US \$ 85.00
5 kw Alternator	US \$ 408.00





ST-1300 TRACTOR

Satoh Agricultural Machine  
Mfg. Co., Ltd.  
Hibiya Kokusai Bldg., No. 2,  
2-chome  
Uchisaiwai-cho, Chiyoda-ku  
Tokyo, Japan  
Telephone: (03) 508-7927  
Teléx: TOK 222-2567  
Cable: Satohzoki Tokyo

Description: 4 cycle, water-cooled, 2-cylinder 13 HP diesel engine;  
transmission--6-forward and 2-reverse speeds with a differential lock;  
3-speed power-take-off (517, 762, 1,249 rpm); hydraulic system directly  
driven from the engine; brakes-internal expanding.

Specifications:

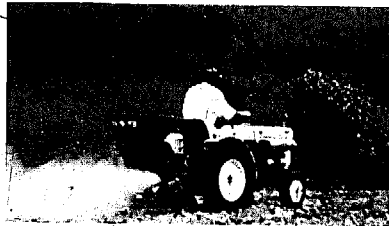
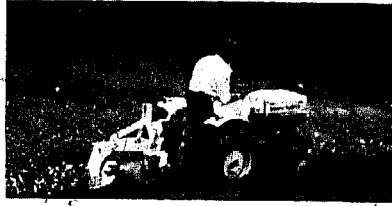
weight	- 470 kg	engine	- 13 HP
length	- 1.89 m	speed	- 1.01km/h to
width	- 1.0 m		12.34km/h
height (to top of steering wheel)	- 1.12 m	fuel capacity	-
wheel base	- 1.22 m	fuel consumption	-
ground clearance	- .26 m		
payload with trailer	- 350-500 kg		

Comment on Maintenance, Productivity, "Appropriateness," etc.: Dry paper element air cleaner is superior in filtration of fine particles of dust to protect the engine; wide variety of implements.

Cost and Present Status (as of 3/12/76): ST-1300 TRACTOR - US \$1,512

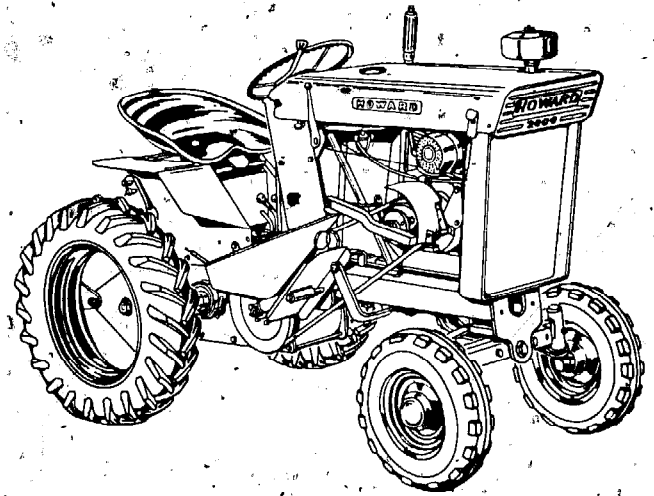
Implements:

Single Moldboard Plow (width-31 cm, depth-26 cm-31 cm)	US \$242
2 Rows Reversible Plow (width-46 cm, depth-15 cm-26 cm)	US \$226
Rotary Tiller	US \$289
3 Point Linkage Assembly	US \$ 91
Trailer (payload-350 to 500 kg)	US \$464



HOWARD 2000 Diesel

Howard Rotavator Pty. Ltd.  
P.O. Box 82  
Parramatta N.S.W. 2150  
Australia  
Telephone: 630.1231  
Telex/Cable: AA21328/ROTAHOE Sydney



Description: Horizontal, 4 cycle, single cylinder air-cooled petrol engine, 14 HP, with electric start and 12 volt battery, alternative condenser cooled, Yanmar 7 HP diesel engine; crank handle starter; transmission-four forward speeds and two reverse speeds are achieved with high and low ratio on 1st, 2nd, and reverse gears; rack and pinion steering; external band type brakes; power take off operated at 1426rpm.

Specifications:

weight	- 408 kg	engine	- 7 HP
length	- 1.77 m	speed	- 1.66km/h to 9.14km/h
width	- .7 m to .9 m	fuel capacity	- 8.1
height	- 1.1 m	fuel consumption	- .76 l/h
payload with trailer	- 800-1000 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.:

Handles all aspects of cultivation in a dry land farming situation; versatile with over 20 attachments; engine sits on the frame using 4 bolts and can be simply removed to be used as a power unit in a beat, irrigation situation, etc.; tank capacity gives 4-5 hours of operation under full load; normal oil changing and greasing maintenance is all that is required and a major overhaul is at about 2,000 hours under normal work conditions; currently marketed successfully throughout the Pacific Islands and the Arabian Gulf countries.

Cost and Present Status (as of 10/1/77): 2000 Diesel-US 1,900

Also available:

Price Range (US\$)

Howard 2000 gasoline  
(Briggs & Stratton 14 HP engine)  
Special airfield and industrial  
models

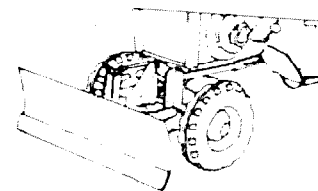
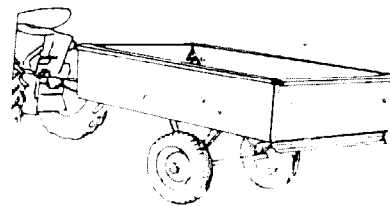
\$1,900

Price on application

Implements:

Rotavator side drive (53.35 cm)	\$ 492
Twin Spindle Rotary Mower (109.22 cm)	\$ 445
Spray Kit with pump (1.905 cm)	\$ 409
Mower (71.12 cm)	\$ 300
Dozer with Linkage (0.914 m)	\$ 97
Front Tipping Bucket	\$ 127
Mouldboard Plough (20.32 cm)	\$ 125
Toolbar with 5 spring tynes	\$ 114
Cart with tipping tray	\$ 215

All implements with Quick Hitch attachment  
(no tools required)



AGRO-UTIL Model "A"

Agro-Util  
Div. Kalamazoo International Inc.  
PO Box 271 - 70 Van Buren Street  
South Haven, Michigan 49090  
USA  
Telephone: 616-637-2178  
Telex: 729452 JENJEN SHAV  
Cable: JENJEN



Description: 4 wheel agricultural tractor, 14 horsepower air-cooled gasoline engine; smaller engine available for substitution; standard equipment includes: three point hitch, 18.9 liter fuel tank and individual rear disc brakes; automotive type steering, electric start, 4 speeds forward, 1 reverse, belt-design drive system.

Specifications

weight	- 408.237 kg	engine	- 14 hp
length	- 220.98 cm	fuel capacity	- 18.93 l
width	- 116.84 cm		
height to hood	- 109.22 cm		
wheel base	- 152.4 cm		
payload capacity			
capacity	- 1 ton		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Specifically designed for use in developing countries by small farmers to increase crop production; simple and safe to operate; maintenance is minimal and requires little or no mechanical background; simple parts package available as option; high profile for crop clearance; design allows shipment in semi-knocked down form for reduced shipping cube; drive system makes substitution of engines in size and power range of the tractor very simple; some available accessories and implements include plough, disc harrow, furrower, cultivator, irrigation pump, two-ton capacity trailer, planter, feedmill grinder, wheel weights, spare parts package, plus others; primary applications: plowing, discing, cultivating, spraying, pumping for irrigation, feed grinding, hauling, off road transport - designed for small to medium size farms; practical features: most notable features found in this size and price range are 3-point hitch for versatile use of more implements,

jumbo fuel tank with 18.9 liter capacity, individual rear wheel disc brakes for turning, easy accessibility to engine output for belt power take-off, front grill is removable and a double sheave is provided as standard equipment.

Cost and Present Status (as of 1/12/78):

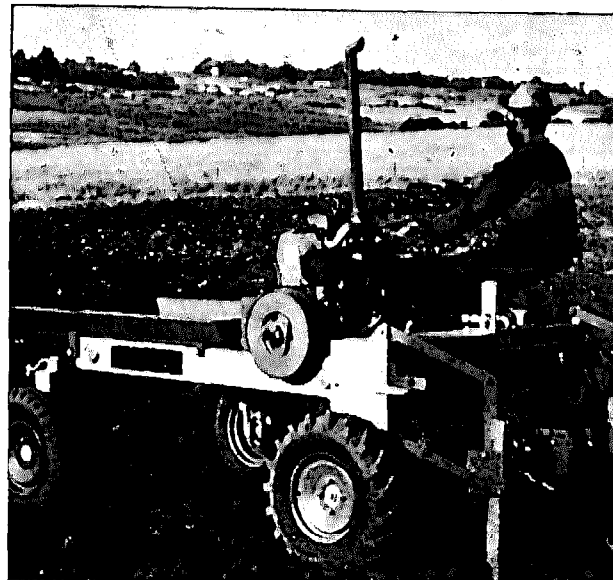
Model "A" Tractor - US\$1,999 single unit net price.





## TINKABI TRACTOR

National Industrial Development  
Corporation  
P.O. Box 450, Manzini  
Swaziland  
Telephone: MBA 3391/2/3  
Telex: SAX 52

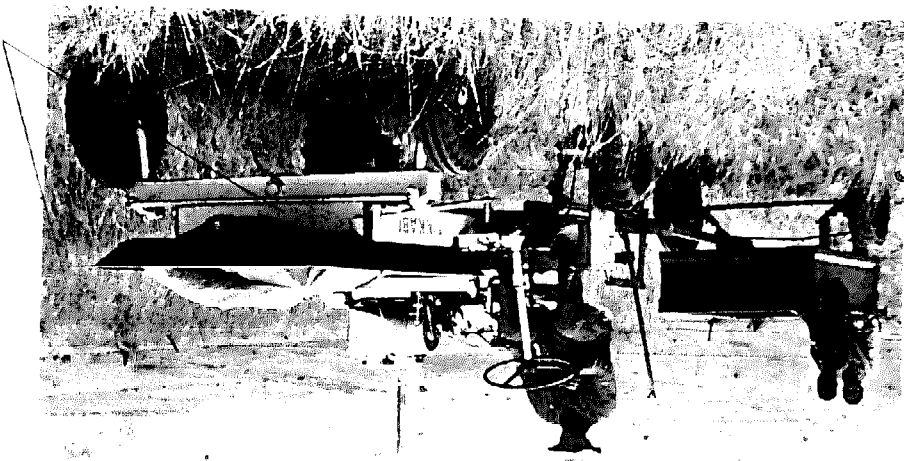


Description: Air-cooled and hand started twin cylinder diesel engine of 16 hp; hydrostatic drive transmission which controls speed, direction, and braking through a single-hand lever.

### Specifications:

weight unballasted	- 1,050 kg	engine	- 16 HP
overall length	- 2.5 m	speed	- 8km/h
overall width	- 1.8 m	fuel capacity	-
ground clearance	- .6 m	fuel consumption	- less than 1.5
wheel base	- 2 m		litres an hour
wheel track	- 1.7 m		under normal
			farm use
payload capacity	- 500 kg, can be increased		
	to 2,000 kg with the		
	addition of a trailer		

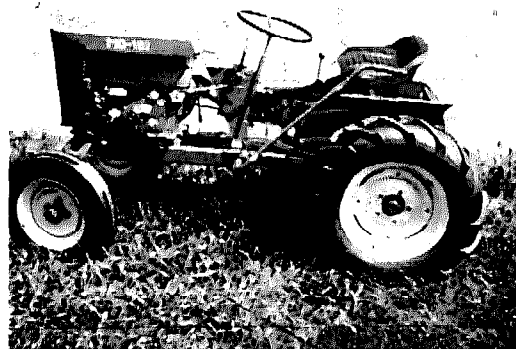
Comments on Maintenance, Productivity, "Appropriateness," etc.: Its range of implements include a plough, planter, cultivator, ridger, harrow, water pump, irrigation set, circular saw, cotton sprayer, hammermill and electrical generator; between service intervals of 250 hours or 6 months, whichever is earlier, the operator needs only fill the fuel tank, keep the tires inflated, and tighten all nuts and bolts; under dry soil conditions, using the Tinkabi single furrow 30 cm moldboard plough, the rate of work is up to 2 hectares a day at 20 cm deep; extensive testing has been carried out in Tanzania, Zambia, Swaziland, U.K., South Africa, Lesotho, Botswana, S.W.A., Mozambique, Kenya and U.S.A.; the work requirements of the Swazi farmer were met under test conditions.



Cost and Present Status (as of 5/77): Commercially produced in Swaziland at about US \$2,000.

### Self-Helper

Self Help Foundation  
P.O. Box 186  
Highway #3 East  
Waverly, Iowa 50677, U.S.A.  
Telephone: 319-352-4483



Description: Two wheel drive, three speed transmission, 41 x 20 cm agricultural grip tires; crank start, 7 h.p. diesel engine; rack and pinion steering; foot and hand braking.

### Specifications

weight (dry)	- 385 kg	engine	- 7 hp
length	- 2.06 m	speed	- up to 8.8 km/h
width	- 1.1 m	fuel capacity	- 8 litres
height	- 1.04 m	fuel consumption	- approximately 1 l/hr for farming operations
wheel base	- 1.41 m		
ground clearance	- 36 cm		
payload with trailer	- 1360 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: The tractor and implements are designed to need only small wrenches and lubricants to maintain and repair; it has been designed to be easily adapted to local assembly; the following agricultural implements are available: moldboard and disc plows, small and large seed planters, disc harrows, cultivators, sickle bar mower, rotary mower, furrower, hiller, root chisel, irrigation equipment, three leveling blades (front, middle, rear mounted), row crop and fruit tree sprayers, and 1,360 kg trailer; serves as a power source for electrical generators, circular saws, hammer mills, stone mills, and chicken plucker; plows up to 2 hectares a day; pulls a 30 cm plow 18 cm deep at 5.6 km/h in hard plowing in second gear; being used in Central and South America, Africa and Asia.

Cost and Present Status (as of 7/1/77): Commercially produced in the United States at about US\$2,100.

G-14 Tractor

Bolens  
Port Washington  
Wisconsin,  
USA



Description: 4 cycle single overhead valve Tecumseh 14 HP engine; Bendix flywheel type electric starter; transmission-6 speeds forward and 2 reverse-with the push of a lever; disc brakes; steering-bevel gear sector and pinion.

Specifications:

weight	- 300 kg	engine	- 14 HP
length	-	speed	-
width	-	fuel capacity	- 5.7 l.
height	-	fuel consumption	-
wheel base	- 1.08 m		
ground clearance	- .18 m		

Comments on Maintenance, Productivity, "Appropriateness," etc.:  
Bolens tractors and equipment are tested under such conditions as the soft and sandy soil of Florida and the rock-hard adobe clay of Texas; also certified by the Outdoor Power Equipment Institute; Bolens has several other models of tractors ranging from 8 HP to 19.5 HP and varied implements such as front end loaders, terra-blades, etc.

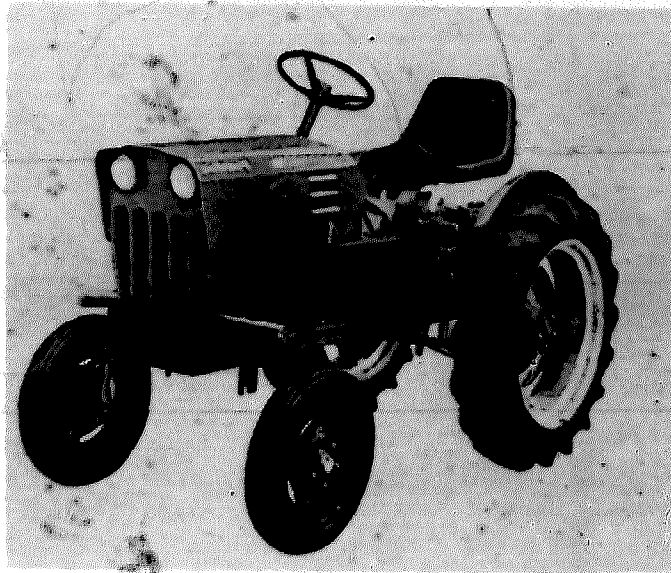
Cost and Present Status (as of 9/15/75): G-14 Tractor US \$ 2,296  
(with 1.07 m mower)

Implements

Dump Cart (.2 cu m)	US \$139
Rotary Tiller (.84 m)	US \$546
Moldboard Plow (31 cm)	US \$136
Cultivator	US \$ 85
Disc Harrow (8 blades)	US \$ 90

Power King Tractor, Model 1614

Engineering Products Co.  
PO Box 1510  
Waukesha, Wisconsin 53187  
USA  
Telephone: 414-547-5558



Description: Air-cooled 14 hp gasoline engine tractor has all-gear drive including automotive clutch, transmission and differential; drop-axle design for maximum crop clearance; 176:1 reduction in 1st gear for high wheel-torque; individual rear wheel brakes; 3-point rear tool hitch with manual or hydraulic lift available.

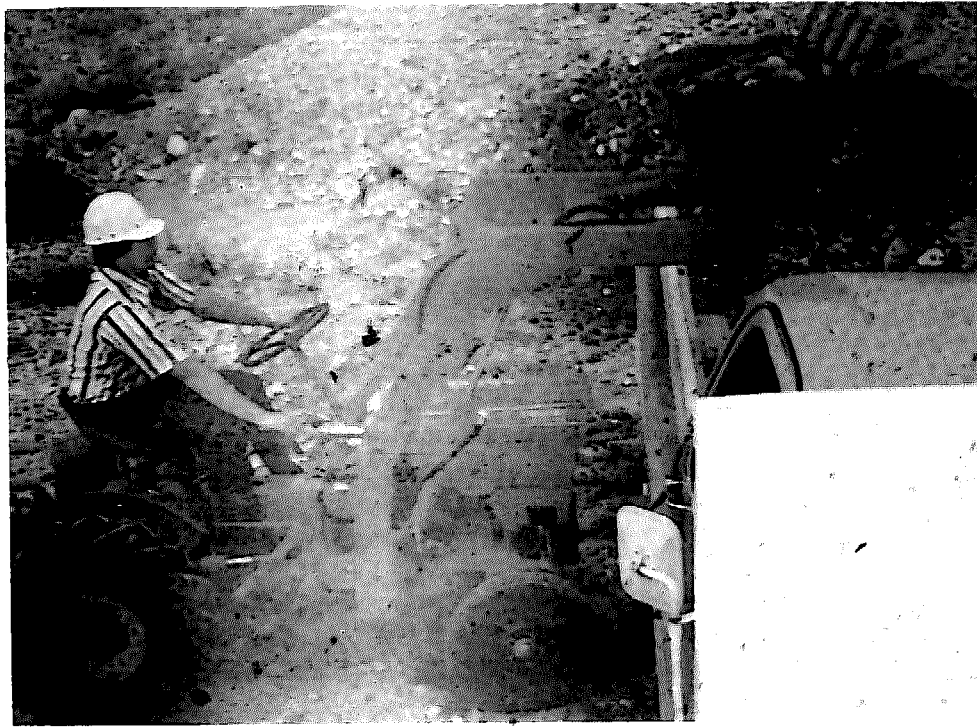
Specifications

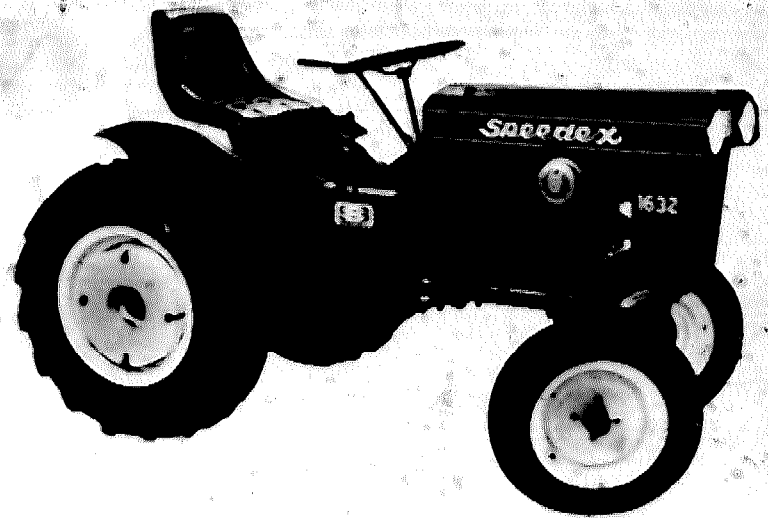
weight	- 467 kg	engine	- 14 hp
length	- 2.36 m	speed	- 2.7 to 9.2 km/hr
width	- 1.05 m		
frame			
clearance	- 0.49 m		
height	- 1.38 m		

Comments on Maintenance, Productivity, "Appropriateness," etc.: In use over 30 years, exported on a limited basis to a number of countries; all gear drive provides maximum work output per installed horsepower and per liter of fuel; high gear ratio; available attachments include 1.22 m snowblower, 1.22 m x .45 m bulldozer-snowplow, 1.22 m V-snowplow, log splitter for up to .66 m long logs, front end loader that lifts up to 295 kg, 1.98 m high with adequate rear weighting - different style bucket attachments; also, .3 m wide moldboard plow, .4 m wide disk harrow, tandem disk harrow, corn and bean planter, seeder-fertilizer, weed-insect sprayer, hay rake, rotary tiller, heavy duty cultivator, spring-tooth cultivator, straddle-row cultivator, tool bar, hiller, and furrower.

Cost and Present Status (as of 1-1-78):

US domestic list price with manual lift: US\$ 2,524 F.O.B. Waukesha, WI  
with hydraulic lift: US\$ 2,752 F.O.B. Waukesha, WI





Speedex Model 1632 Tractor

Mechtron International Corporation  
 2140 W. Washington Street  
 Orlando, Florida 32805  
 USA  
 Telephone: 305-843-9880

Description: 16 hp Kohler cast-iron engine; 3 forward speeds; primary drive-belt; equipped with dual independent rear wheel brakes; category "0" 3-point hitch is standard.

Specifications

weight	-	377 kg	engine	-	16 hp
length	-	2.121 m	speed	-	3.30 k/h to 10.96 k/h
width	-	1.067 m	fuel capacity	-	11.4 l
height	-	1.092 m			
wheel base	-	1.372 m			
ground clearance	-	35.6 cm			

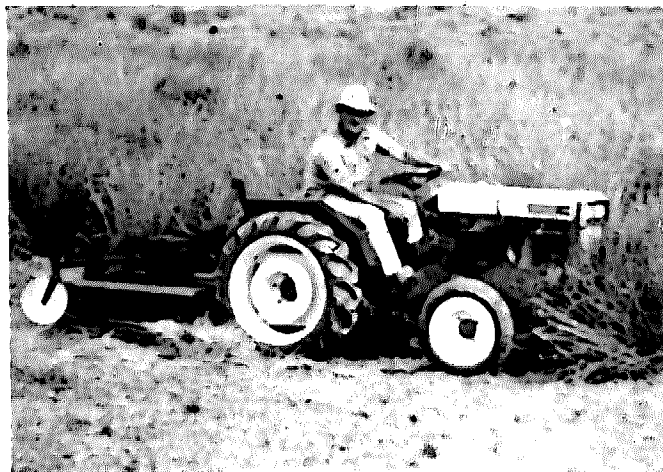
Comments on Maintenance, Productivity, "Appropriateness," etc.: Designed for small farms.

Cost and Present Status (as of May 1977): US\$2,540.

Implements

Plow	-	25.6 cm	US\$190
Disc set	-	14 blades	US\$161
Cultivator	-	rear mount	US\$190
Furrower	-		US\$ 21
Dump cart	-	163 l without sideboards	US\$131

AGRALE 4100



AGRALE S.A.  
Tratores e Motores  
Estrada Federal BR 116, Km 125  
C.P. 1311 95100, Caxias do Sul, R.S.  
Brazil

Telephone: (0542) - 21.35.00 and (0542) 21.35.15  
Telex/Cable: 0542.156

Description: Four stroke, air-cooled, 16 hp diesel tractor; BOSCH 12V electrical system with starter and generator; heavy duty differential lock gear box with 7 forward gears and 3 reverse; dry plate, spring loaded clutch, power takeoff; foot operated brakes, directional, individual, or conjugated in the rear wheels; lock lever for parking, lifting system driven by a hydraulic pump coupled directly on the front mounted P.T.O. of the engine.

Specifications

weight	- 950 kg.	engine	- 16 hp
length	- 2.30 m	speed	- 1.16 to 13.25 km
width	- (between axles) 1.10 m	fuel capacity	-
height	- 1.16 m	fuel consumption	-
payload capacity	- 1.5 tons		
ground clearance	- .22 m		

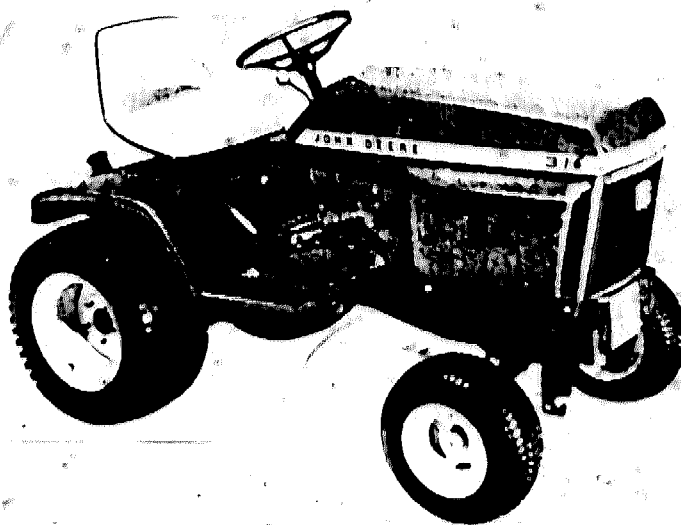
Comments on Maintenance, Productivity, "Appropriateness," etc.: Developed and marketed in Brazil for use on small farms; tested by the Brazilian Ministry of Agriculture under varied soil and climate conditions; numerous attachments available including a disk plow, harrow, rotary cultivator, furrow plough, mower and cart.

Cost and Present Status (as of 2/6/78): (F.O.B.) packed : US\$ 2,678  
unpacked : US\$ 2,585

Prices of attachments furnished on request.







### 316 Tractor

John Deere Horicon Works  
 220 East Lake  
 Horicon, WI 53032  
 Telephone: (414) 485-4411

Description: 16 hp tractor, fully enclosed single-cylinder, 4-cycle, air cooled engine, gasoline driven; single lever hydrostatic drive with front, center and rear hydraulic lift, dual levers; individual braking system on rear wheels operated independently by dual foot pedals; automatic key start with safety features; many optional attachments available.

		<u>Specifications</u>	
weight	- 347 kg	engine	- 16 hp
length	- 1.753 m	speed	- .8 to 10.5 km/hr.
width	- 1.079 m	fuel capacity	- 17.034 litres
ground clearance	- .156 m	fuel consumption	- 5.8 litres/hr
height	- 1.118 m		
wheel base	- 1.168 m		
payload capacity with trailer	- Depends on trailer, ballast on tractor, and whether trailer has brakes.		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Implements include 1.68 m and .965 m mowers, 1.372 x .0457 m front blade, snow thrower, rotary tiller, 3-point and integral hitch, and front mounted PTO attachments; no information on present international usage.

#### Cost and Present Status (as of 8/1/77):

Manufactured in USA

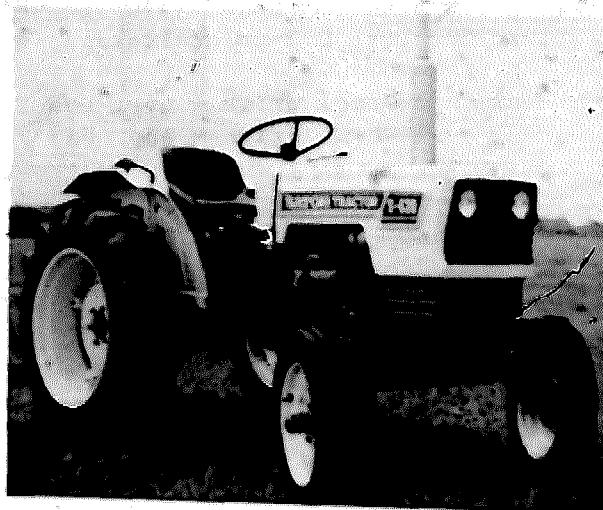
Retail priced at US\$2795

Price of implements vary from US\$280 to US\$695

Also Available: Model 214 - 14 hp. engine, standard mechanic lift (hydraulic or electric optional), weight 334 kg. - US\$2195.

Satoh Tractor Model S63D (Bull)

Satoh Agricultural Machine  
Mfg. Co., Ltd.  
Hibiya Kokusai Bldg., No. 2, 2-chome  
Uchisaiwi-cho, Chiyodo  
Tokyo,  
Japan  
Telephone: Tokyo 508.7927  
Cable: "SATOZHOKI" Tokyo  
Telex: TOK 222.2567



Description: 2 cylinder, 4 cycle, water-cooled, 25 hp diesel engine tractor; 2 wheel or 4 wheel drive; dry single disc clutch with 9 forward and 3 reverse speeds, differential gear, differential lock; multi-speed rear P.T.O., 3-point category I linkage and permanent drawbar; water-proof internal expansion drum type brake with parking brake; 12-volt 70 AH electrical system.

Specifications

weight	- 910/970 kg (2 wheel and 4 wheel drive)	engine	- 25 hp
length	- 2.45 m	speed range	- 1.26 km/h to 18.41 km/h
width	- 1.265 m	fuel capacity	- 20 litres
height	- 1.975 m	fuel consumption	-
wheel base	- 1.524 m		
ground clearance	- .41/295 m (2 wheel and 4 wheel drive)		
payload capacity	-		

Comments on Maintenance, Productivity, "Appropriateness", etc.: Complete manual provided with maintenance instructions; implements include rotary tiller and front P.T.O.

Cost and Present Status (as of 10/77):

Ex-godown, Japanese port: 2-wheel drive-app. US\$ 2,800  
4-wheel drive-app. US\$ 3,200

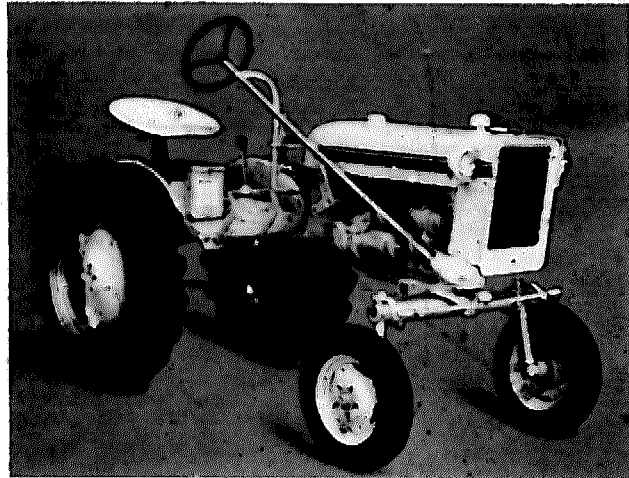
Also Available : Model 5370 (Beaver) - 15 HP diesel engine, 2 and 4 wheel drive, category O 3-point linkage, 6 forward speeds, 2 reverse, priced at :

2-wheel drive - app. US\$ 1,770

4-wheel drive - app. US\$ 2,033

International Cub Tractor

International Harvester  
Agricultural Equipment Division  
401 N. Michigan Avenue  
Chicago, Illinois 60611  
USA  
Telephone: 312-670-2000



Description: IHC-60, 4 cylinder, 15 HP, liquid-cooled gasoline engine; electrical starter; transmission-selective sliding spur type gears; 1900rpm power take-off; band type brakes; steering-worm and gear with center point control; touch control hydraulic system-engine mounted 10.6l/m pump delivers live power whenever the engine is running.

Specifications:

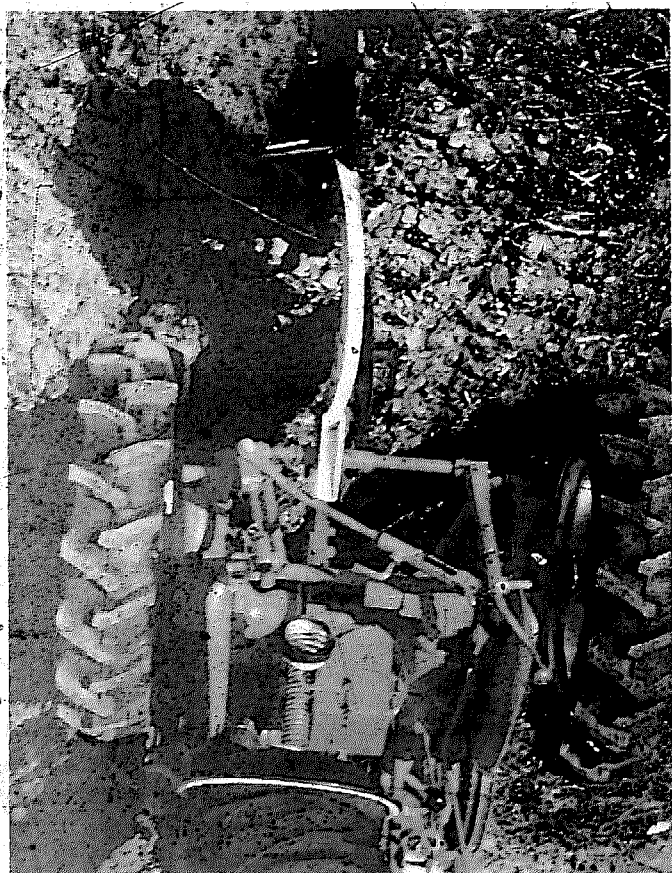
weight	- 653 kg	engine	- 15 HP
length with hitch	- 2.5 m	speed	- 5km/h to 14.8km/h
width	- 1.5 m	fuel capacity	- 28.4 l
ground clearance	- .5 m	fuel consumption	- 3.46 l/hr
height (to top of steering wheel)	- 1.6 m		
wheel base	- 1.8 m		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Major contributing factor in the mass conversion of mule and horse power to tractor power in the USA during the 50's; due to Cub's offset design, you see everything straight ahead easily without having to lean to the side-great for working in row crops; manual hand lift is available in lieu of the hydraulics for less cost and easier serviceability; air-cooled diesel engine could be fitted in lieu of the gasoline engine.

Cost and Present Status (as of 7/14/77 ): Cub-US \$2,970

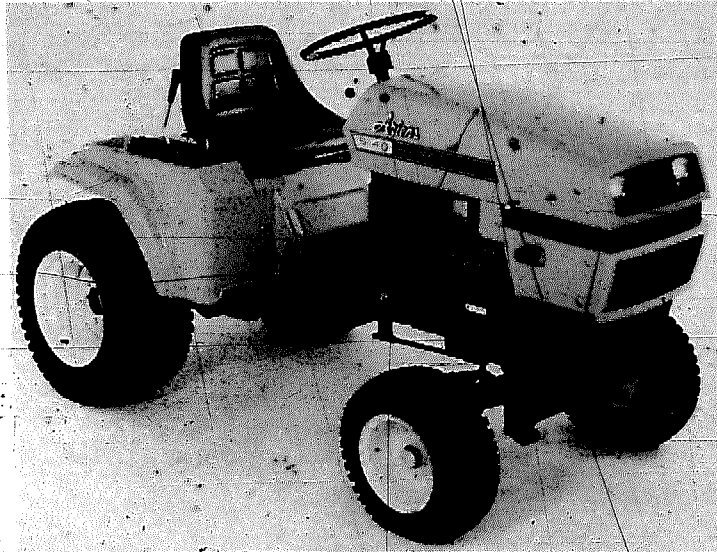
Implements: (wholesale prices)

54A middle mounted blade	US \$207.75
Model C-3 center mounted rotary cutter (cuts a 1.5 m swath)	US \$262.50
L-38 disk harrow (1.2 m or 1.6 m sizes)	US \$225.75
114 cultivator (handles row widths from .9 m to 1.4 m)	US \$274.05
L-194 one bottom Fasthitch moldboard plow	US \$200.83
22 sicklebar mower (has a 1.5 m cut)	US \$213.75
#1200 flat bed trailer (payload-550 kg)	US \$266.25



## ARIENS TRACTOR

The Ariens Company  
655 West Ryan St., Brillion  
Wisconsin 54110  
USA  
Telephone: 414-756-2141  
Telex: 26-3490



Description: Single cylinder, 4-cycle, fan cooled, electric start, 10-14 hp gasoline engine; rear wheel drive; 4 selected speeds forward and reverse speed; enclosed gear transmission and differential with belt clutch; drum brakes on each rear wheel; manual lift on 10 hp model and hydraulic lift on 14 hp model; 540 rpm front P.T.O. and 3250 rpm rear P.T.O.

### Specifications

weight	-	385 kg	engine	-	10 or 14 hp
length	-	1.57 m	speed	-	2.2 k/h to 8.7 k/h
width	-	.86 m	fuel capacity	-	
height	-	1.00 m	fuel consumption	-	
wheel base	-	1.09 m			
payload with a trailer	-				

Comments on Maintenance, Productivity, "Appropriateness," etc.: Its range of implements includes trailers, rotary tiller, mowers, 3,000 or 5,000 watt generator, front loader, front dozer blade, plough, disc; thousands of units operating in USA, Canada, Europe and Australia.

### Cost and Present Status (as of 10/77):

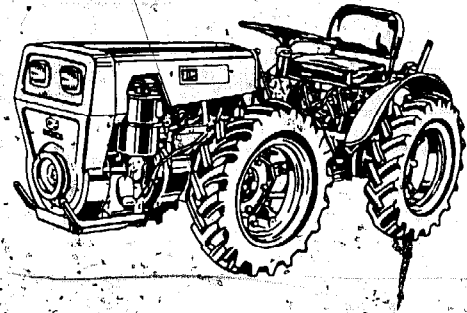
Manufactured in United States  
Exported FOB factory  
Approximate export retail price range - US\$2,999 - US\$3,799

### Also Available:

12, 14, 16 and 18 hp engine models with hydrostatic drive.  
Approximate export retail price range - US\$3,999 - US\$4,999

8900-D Agria

Agria Hispania, S.A.  
Amorebieta (Vizcaya)  
Spain,  
Telephone: 673-04-50  
Telex/Cable: 32448 Agria E



Description: Articulated tractor equipped with a 4 stroke, 1 cylinder, air-cooled, 20 HP diesel engine; transmission-12 speed gearbox; differential-on both axles with lock and automatic release; steering-globoid, worm gearing; brakes-independent front and rear; lift-hydraulic with lifting capacity of 1500 kg; 4 wheel drive with possibility of disconnecting front section; PTO shaft-4 speeds from 540 to 1000rpm.

Specifications:

weight	-	950 kg	engine	-	20 HP
length	-	2.43 m	speed		
width	-	.81 m	fuel capacity		
height	-	1.00 m	fuel consumption		
ground clearance	-	.24 m			
payload with driving trailer	-				

Comments on Maintenance, Productivity, "Appropriateness," etc.: Trailer can be mounted on tractor with 4 bolts; a driving trailer with synchronized gears is also available; smaller tires are available which reduce the ground clearance to .20m.



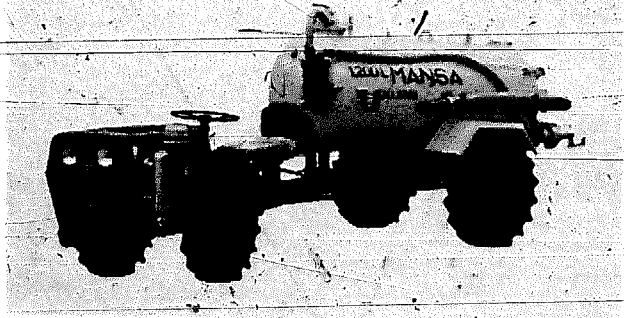
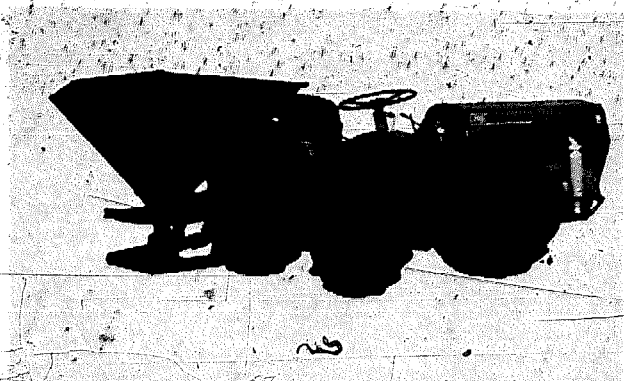
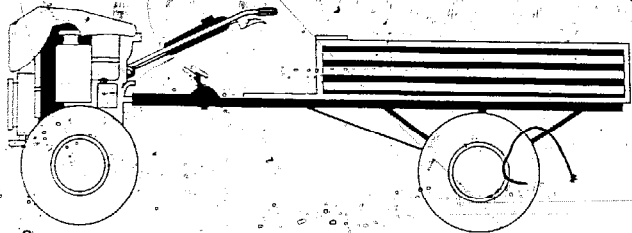
Cost and Present Status (as of 6/30/77): 8900-D Agria - US \$3,076

Also available:

Model Number

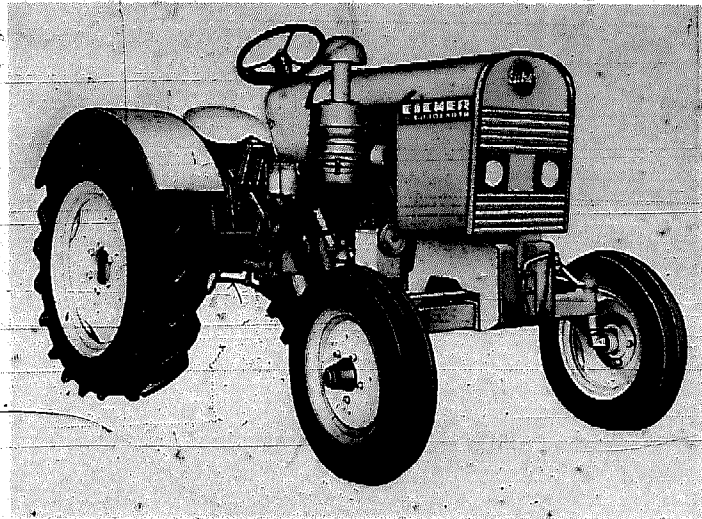
9900	Articulated Tractor (30 HP engine & weight-1150 kg)	US \$3,560
1900ED/20	Two Wheel Tractor (18 HP engine & weight-420 kg)	US \$1,373
7000	Motorhoe (9 HP engine & weight-115 kg)	US \$ 708
3000 EL	Motorhoe (7 HP engine & weight-47.5 kg)	US \$ 410

All of these have a varied range of implements such as plows, cultivators, hoeing attachments, and trailers-with and without traction.



## Eicher-Goodearth Tractor

Eicher Tractors India Limited  
Deepak, 3rd Floor  
13 Nehru Place  
New Delhi 110024  
India  
Telephone: 633612  
Telex/cable: TRACEICHER



Description: Air cooled 26.5 hp diesel tractor at 1650 rpm, single cylinder, four stroke, 6 forward and one reverse speed, foot operated expanding type brakes, independent for left and right rear wheels (with coupling latch to hand operated parking brakes), manual start, self starter optional; 495 rpm P.T.O.

### Specifications

weight	- 1,559 kg	engine	- 26.5 hp (SAE)
length	- 2.90 m		- 24.0 hp (DIN)
width	- 1.53 m	speed range	- 2.03 km/hr to
ground clearance	- .38 m		24.70 km/hr
height	- 1.66 m	fuel capacity	- 34.00 liters
wheel base	- 1.76 m	fuel consumption	
haulage capacity	- 9 tons, level road, 5-6 tons in fields	while plowing	- 1.5 to 2.5 liters/hr.

Comments on Maintenance, Productivity, "Appropriateness," etc.: Simple design, low fuel consumption, low maintenance cost; matching implements include mould-board plow, disc plough, offset disc harrow, paddy puddler, cage wheel, paddy disc harrow, ridger, tiller and land leveller.

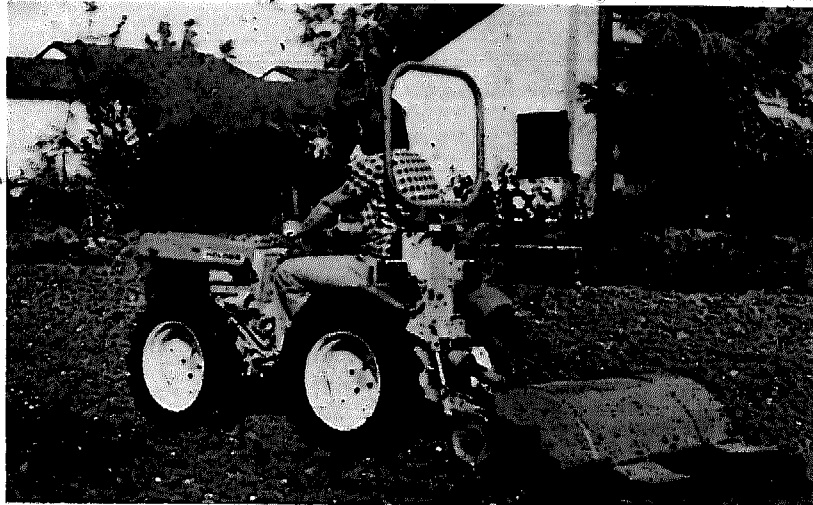
### Cost and Present Status (as of 2/1/78):

Export price US\$ 3,385 F.O.B. Indian port.

Price of implements - ranging from US\$150 to US\$420.

Cultitrac A18

Gebrüder Holder GmbH & Co.  
P.O. Box 66  
D 7418 Metzingen  
West Germany  
Telephone : 07123-1331  
Telex : 07245319



Description: Four-wheel drive, articulated tractor; complete electrical system and hydraulic equipment; 18 hp air-cooled four-stroke diesel engine, 6 forward and 3 reverse gears, four-wheel drive via 2 differentials, diff-lock; articulated steering acting on all four wheels, two independent braking systems, i.e., foot and hand brakes acting independently on all four wheels, three-point linkage.

Specifications

weight	- 900 kg	engine	- 18 hp SAE (12 kw)
length	- 2.28 m	speed	- .5 k/h to 20 k/h
width	- .74 m/.98 m	fuel capacity	- 6.5 liters
height	- 1.06 m	fuel consumption	- 254 g/kwh
wheel base	- 1.12 m		
ground clearance	- .25 m		
payload with trailer	- 830 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Designed for maneuverability in smallest spaces, i.e., narrow row cultivations, weight distribution permits a small ground pressure; most suitable for vineyard and nurseries; implements include rotary cultivators (70-100 cm working width), rear-mounted mower (120 cm), full-turn and border ploughs, tractor-mounted sprayer, and trailer.

Cost and Present Status (as of 1/78):

Approximately US\$3,500.



## Buffalo Tractor

Waverly Tractor Company  
Sleeping Giant - Hwy. 3 East  
Waverly, Iowa, U.S.A. 50677  
Telephone: 319-352-3130



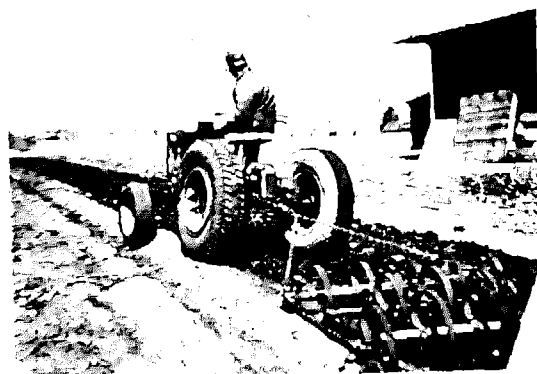
Description: Air cooled, two cylinder 18-26 HP diesel engine; gasoline engine is also available; hand start; hydrastatic drive (full testing on the hydrastatic model is not complete at this time), or 4-speed constant mesh transmission, 3 forward, 1 reverse; hydraulic 3-point hitch; independent rear wheel disc brakes.

### Specifications

weight	-	715 kg	engine	-	18-26 HP
width	-	1.422 m	speed	-	up to 12 km/h
height	-	1.397 m	fuel capacity	-	22.7 litres
wheel base	-	1.676 m	fuel consumption	-	under normal farm use, about 1.8 l/h

Comments on Maintenance, Productivity, "Appropriateness," etc.: Its range of implements include a plow, planter, cultivator, disc harrow, chisel point or sub-soiler; between service intervals of approximately 6 months, the operator need only fill the fuel tank, keep the tires inflated and tighten all nuts and bolts; under dry soil conditions using a 41 cm moldboard plow, the rate of work is up to 3 1/2 hectares a day at 20 cm deep; basic design has been field tested in North and South America, Africa and the Caribbean area for over 14 years; a full set of drawings will be made available so one can assemble his own Buffalo tractor.

Cost and Present Status (as of 8/77): Commercially produced in Waverly, Iowa, U.S.A. ranging from about US\$3,600.



## TE Tractor

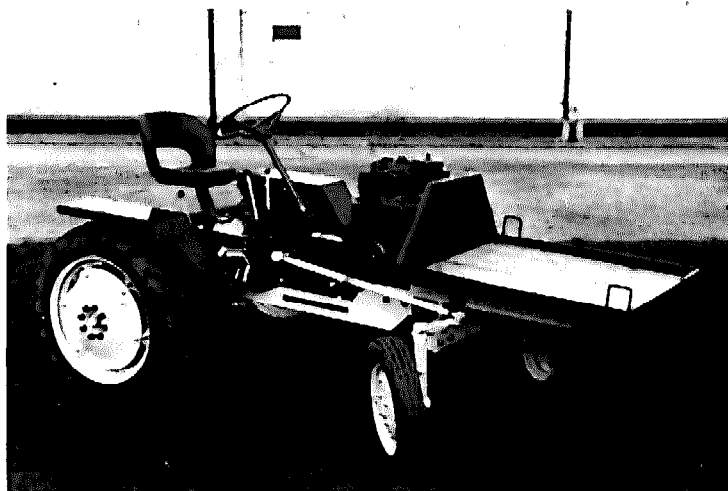
Bouyer S.A.

Boite Postale No. 7

54510, Tomblaine, France

Telephone: (28) 29-26-62

Telex: 960484 F



Description: Air-cooled, one or two cylinder, 4 stroke, diesel engine from 15 to 25 HP; hand starter is standard - optional electrical starter; mechanical gear-box with 6 forward speeds and 3 reverse, differential lock with automatic disengaging; drum brakes - independent for ploughing or coupled for operating on roads; power take-off - 1000 rpm.

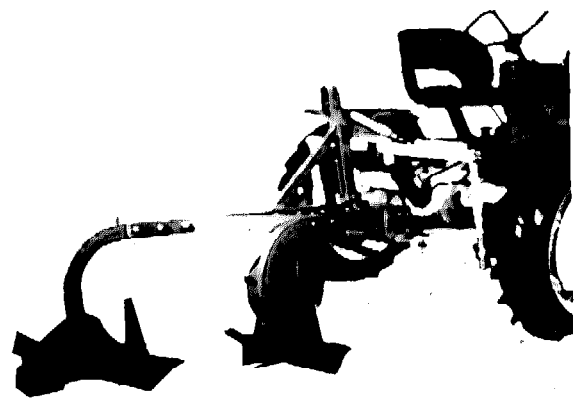
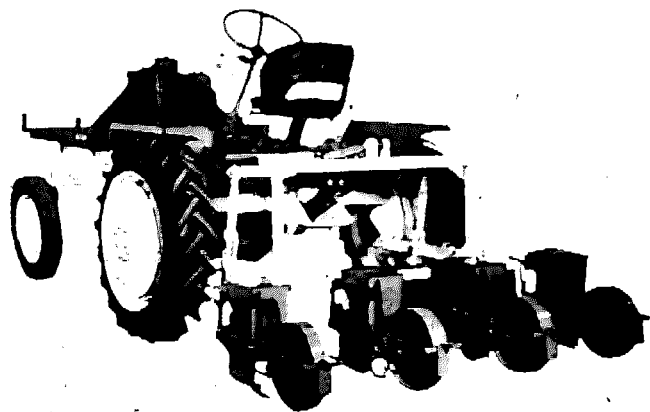
### Specifications

weight	- 1100 kg	engine	- up to 25 HP
length	- 3.10 m	speed	- 1.48 km/h to 15.75 km/h
width (with minimum tread)	- 1.80 m	fuel capacity	- 31 litres
height	- 1.50 m	fuel consumption	- max. 2 l/hr. plowing
wheel base	-		
ground clearance	- .56 m		
payload of front load pan (1 m x 1.1 m)	- 500 kg		

### Comments on Maintenance, Productivity, "Appropriateness," etc.:

Its range of implements includes a double furrow plough, cultivator, ridger, disc-harrow (width - 1.30 m), flail-mower, four row seeder, and also in the near future a 500 l sprayer, rear rotavator, flour mill, and two-disc plough; maintenance - farmers are required to tighten units and bolts regularly; sold in Tunisia, Morocco, Greece, Ivory Coast, Mali, Senegal, Upper Volta, Chad, Cameroon, East Africa Community.

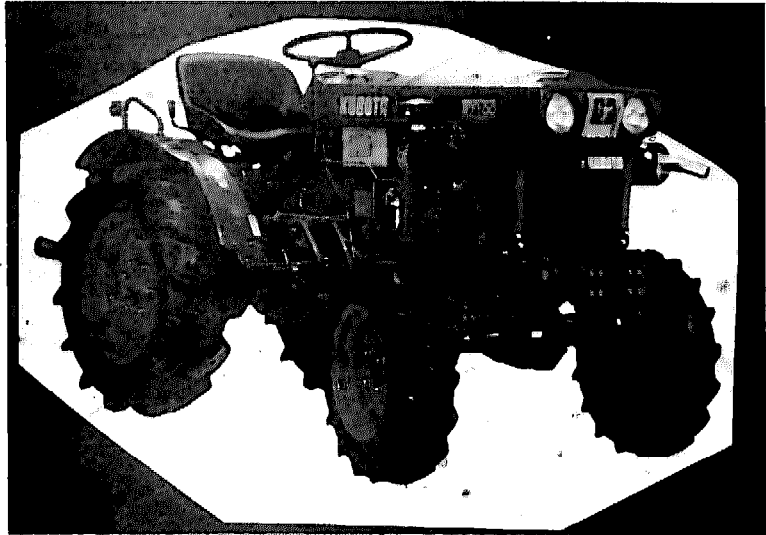
Cost and Present Status (as of 8/77): TE Tractor - US\$3,800 (ground unit)





B7100 Tractor

Kubota Ltd.  
22-2 Funade Mati Naniwaku  
Osaka  
Japan  
Telephone: 06-648-2111  
Telex: 7810-526-7785



Description: 16 hp, 4 cycle, 3 cylinder, water-cooled diesel engine; 4 wheel drive; front and rear P.T.O. shafts; hydraulic lifting system: 6 forward and 2 reverse speeds; independent rear brakes.

Specifications

weight	- 475 kg	engine	- 16 hp
length	- 1.99 m	speed	- .98 km/hr to 13.02 km/hr
width	- 1.01 m	fuel capacity	- 15.5 l
ground clearance	- .24 m		
height	- 1.14 m		
wheel base	- 1.24 m		
payload capacity with trailer	- 499 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Accommodates a variety of implements for tilling, cultivating, ploughing, loading, etc.

Cost and Present Status (as of 9/1/77):

B7100 - US\$3,895.

Also available:

L185FP model - 2 wheel drive, engine - 17 hp, weight - 725 kg, price - US\$4,050  
L245DTP model - 4 wheel drive, engine - 25 hp, weight - 910 kg, price - US\$4,895

Universal "serie 200"

Goldoni SpA  
Via Canale 3  
41012 Migliarina di  
Carpi (Modena)  
Italy  
Telephone: 0522-699240  
Telex: 53023 GOLDONI



Description: 4 stroke, air-cooled diesel engine from 28 to 38 hp; four-wheel drive with central articulation; three point hydraulic lift (maximum lifting capacity - 700 kg); 2 P.T.O. shafts, one of which can be synchronized for a trailer with differential; electrical start and light installation with 12 volt battery; gear box with 9 speeds - 6 forward and 3 reverse; drum type brakes on four wheels; differential on both axles; mechanical or hydraulic steering; track adjustable without wheel track expanders.

Specifications

weight	- 945 kg	engine	- 28 to 38 hp
length	- 2.45 m	speed	- 1.2 km/h to 21.0 km/h
width	- .94 m	fuel capacity	- 16 litres
ground clearance	- .21 m	fuel consumption	- about 180 grs per hp/h
height	- 1.12 m		
payload capacity with trailer	- 2,500 kg.		

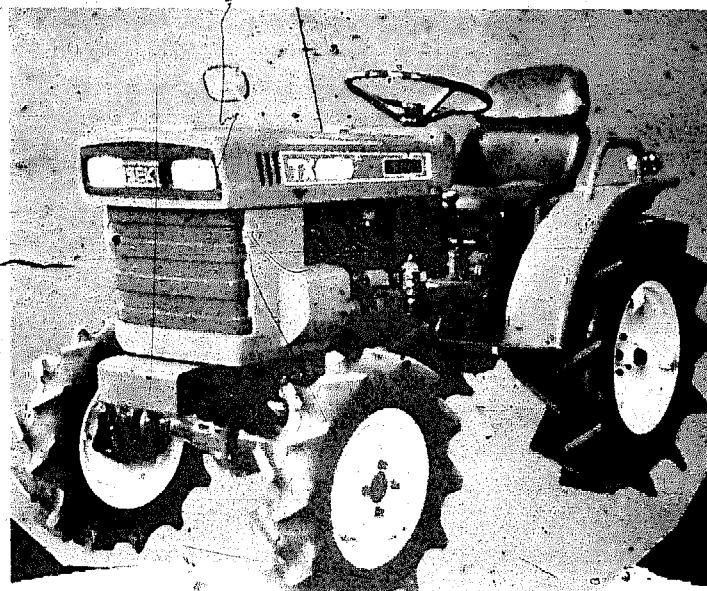
Comments on Maintenance, Productivity, "Appropriateness," etc: Its range of implements includes: rotary cultivators, trailer, spraying and centrifugal water pump, fibreglass tank, ploughs, front hydraulic implements, side mower, circular saw bench, post-hole auger, etc; used in various conditions on plains, hill-sides, and other difficult terrains; has been exported to many different countries throughout the world; capacity of work with plough: depth 30/35 cms - width 30/35 cms - 1600 sq/mts per hour; capacity of work with rotary cultivator: width 115 cms - 2400 sq/mts per hour.

Cost and Present Status (as of 1/1/77): From US\$4,886.00 for the 28 hp. to US\$5,886.00 for the 38 hp; Cost of implements varies from US\$52.55 to US\$1,905.10.



TS2210 ISEKI Tractor

Iseki Agricultural Machinery.  
Mfg. Co., Ltd.  
Overseas Department  
1-3, Nihonbashi, 2-chome,  
Chuo-ku, Tokyo, 103 Japan  
Telephone: 03-271-1271  
Telex: 222-2821  
Cable: ISEKIRICE TOKYO



Description: Water-cooled, 4-cycle, 2-cylinder 22 HP diesel engine; speed operation can be conducted through selection of 9 forward and 3 reverse speed transmission and 4 speed power take-off; implement lift has independent hydraulic system; differential lock is standard; ball-screw type steering system;

Specifications

weight	- 930 kg	engine	- 22 HP
length	- 2.51 m	speed (travelling)	- 1.37 km/h to 14.5 km/h
width	- 1.28 m	fuel capacity	- 20.1
height	- 1.32 m	fuel consumption	-
wheel base	- 1.56 m		
ground clearance	- .35 m		

payload with trailer -

Comments on Maintenance, Productivity, "Appropriateness," etc.: 4-wheel drive is available; many implements which will perform the following type tasks--plowing and tillage, harrowing, puddling and leveling, ridging and weeding, fertilizing and seeding, harvesting, transporting, and light road maintenance.

Agria 4800 L Tractor

Agria-Werke GmbH  
D7108 Moeckmuehl  
West Germany  
Telephone: 06298/5061  
Telex: 0466791



Description: Air-cooled, 4-stroke single cylinder 19 hp diesel engine; gearbox - 6 forward and 6 reverse speeds, differential lock; rear P.T.O. - 825 rpm, independent of gear speed; hydraulic lift; segment-gear steering; wheel and steering brakes; electric start.

Specifications

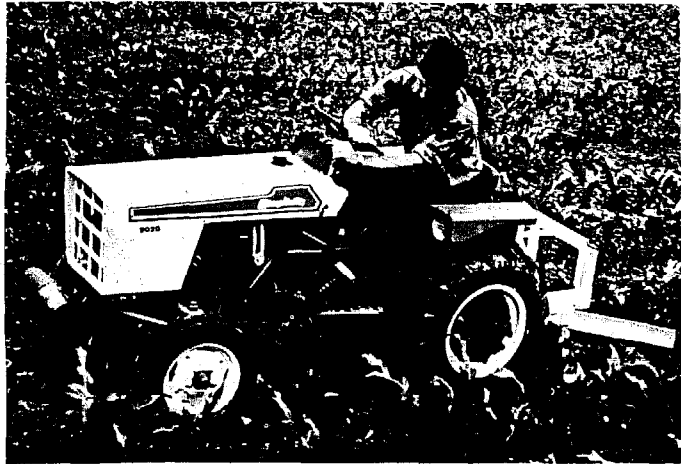
weight	- 600 kg	engine	- 19 hp
length	- 2.25 m	speed	- 1.2 km/h to 16.5 km/h
width	-	fuel capacity	-
ground clearance	- 25 cm	fuel consumption	-
height	- 1.10 m		
payload capacity with two wheeled trailer with spring suspension	- 1000 kg		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Designed to fill the gap between the range of operation of the two-wheel tractor and the conventional 4-wheel tractor in agriculture, horticulture, orchards and vineyards, and also in the trades and municipalities sector; agricultural operations include: rotary hoeing and cultivating with working widths of 90 and 110 cms, ploughing in all kinds of soil, spraying - 100 l tank and boom adjustable from 70-130 cms, and mowing - rear mounted sidemower with width of 120 cms.

Cost and Present Status (as of ):

Also available: Agria 2700 Two-Wheel Tractor - 13 hp, four stroke, diesel engine; weight - 270 kg; two P.T.O. shafts; speeds - 1.2 to 19 km/h; gearbox - 6 forward and 3 reverse speeds.





19-1/2 HP Power Max

Simplicity Division of Allis-Chalmers Corp.  
 500 N. Spring St.  
 Port Washington, WI 53074  
 USA  
 Telephone: (414) 377-5450  
 Telex/Cable: SIMPWAS

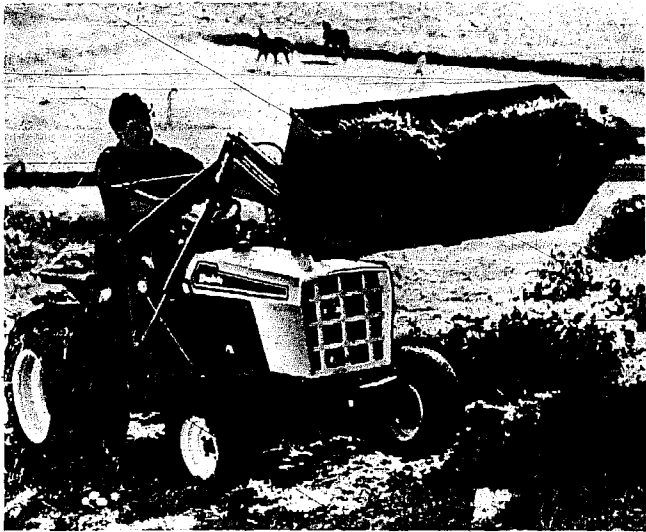
Description: 19.5 horsepower tractor with 12 volt electrical system and hydraulic front, center and rear power lifts; two cylinder air cooled Onan CCKB engine, hydrostatic transmission; individual disk brakes located on differential output shafts; three point linkage, three forward speeds and three reverse speeds.

Specifications

shipping weight	- 589.7 kg	engine	- 19.5 hp
length	- 2.11 m	speed	- 6.76 km/h to
width	- 1.27 m		16.75 km/h
height at steering		fuel capacity	- 14.38 litre
wheel	- 1.22 m	fuel consumption	-
* wheel base	- 1.42 m		
ground clearance	- .381 m		
▶ payload	-		

Comments on Maintenance, Productivity, "Appropriateness," etc.: Designed for all season versatile performance; can be matched with up to 20 attachments which include a sickle bar (1.52 m), front end loader (.19 cubic m, 295 kg capacity), dozer blade (1.52 m), rotary tiller (1.22 m), grader (1.52 m) cultivator (1.37 m), moldboard plow, and optional PTO. High clearance (381 mm) with drawbar removed. Most suitable for small farms.

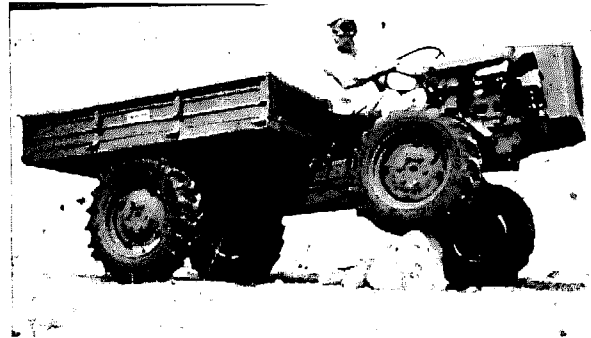
Cost and Present Status (as of \_\_\_\_\_):





Motoagricola 35/DT A

SO. GE. M.A. S.p.A.  
Zona Ind. Nord "Regnano"  
06012/Citta di Castello/  
Perugia  
Italia  
Telephone: 075/852270,  
853609, 852731, 854690  
Telex: 66074 Nardi



Description: 4-wheel drive tractor with reversing gears and with 3-point draft-controlled universal lift; 4 stroke, 2 cylinders, air-cooled, 30 HP diesel engine; foot brake and hand brake; transmission- 8 forward and 8 reverse gears.

Specifications:

weight (including lift)	- 1,430 kg	engine	- 30 HP
length	-	speeds	- 1.63km/h to 20km/h
width	-	fuel capacity	-
height (to steering wheel)	- 1.52 m	fuel consumption	-
ground clearance	- .44 m		
variable track:			
front end	- 1.24m-1.32m		
rear end	- 1.20m-1.48m		
distance between axles	- 1.85 m		
payload dump body (190cm x 150cm x 35cm)	-		



Comments on Maintenance, Productivity, "Appropriateness," etc.:

Capable of handling steep and muddy terrain, narrow and winding roads; the following tasks can be performed :

- (1) hauling -- dump body which is located over rear wheels is easily tilted by removing only a front pin, ribbed steel is used for the platform and pressed steel for the sides;
- (2) plowing -- a transversal off-setting system permits complete tilling ;
- (3) hoeing -- rotary hoe has working width up to 116cm and can reach a depth of 12-18cm, where hoeing has to be done simultaneously between plant rows and individual plants, possible to attach a hoe operated by a 3-position oil-powered feeler;
- (4) seeding -- single-seed and single-germ drills are available in 1,2,3, and 4 row types and have independent adjustable components;
- (5) transplanting -- transplanter is equipped for watering each seedling as it is planted;
- (6) cultivating and ridging -- rotary cultivator has adjustable width and working depth;
- (7) irrigating -- various types of pump can be attached for sprinkler and flush irrigation;
- (8) spraying -- large tanks (800-1000 liters) can be mounted;
- (9) reaping -- hydraulically operated cutter bars can be mounted in back, at the sides, and in front of the tractor;
- (10) sawing -- power take-off can drive circular and belt saws and winches for dragging logs;
- (11) loading -- a mounted revolving rear loader is oil-powered; and
- (12) road maintenance and other operations -- both bulldozer blade (width-1.5m & height-.5m) and angledozer blade (width-1.65m & height-.5m) are attachable in front.

Cost and Present Status (as of \_\_\_\_\_): 35/DT A - US \$

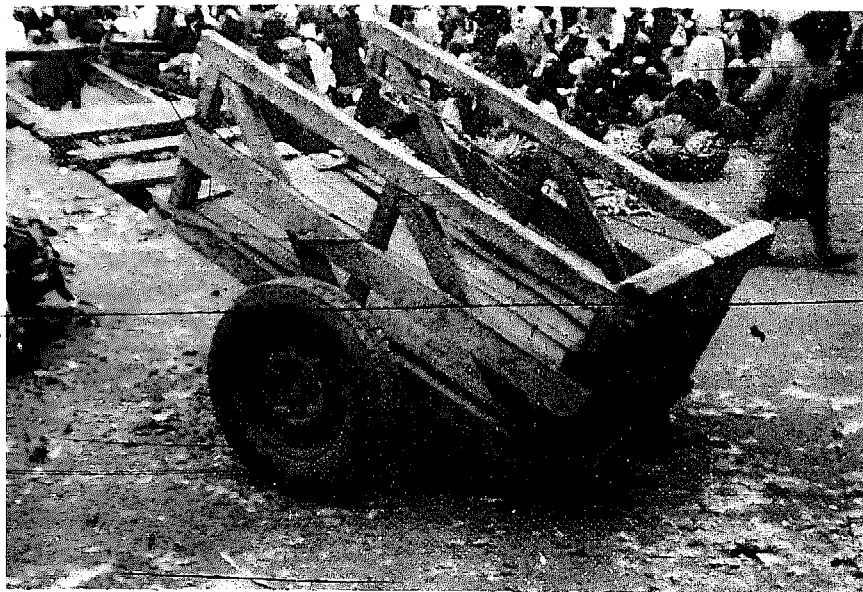
Also available is the 35/DT B model which is designed for hilly terrain and has a lower ground clearance of .29 m.

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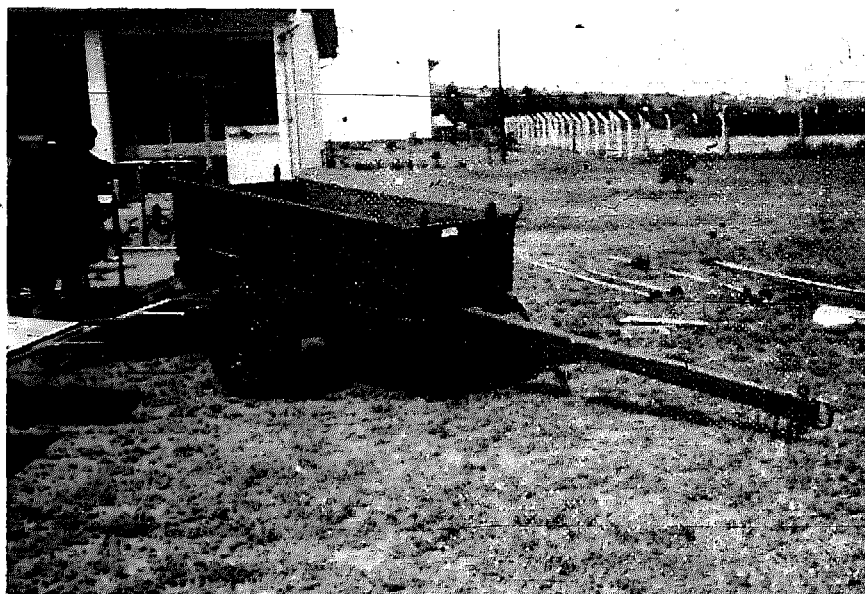
8. PRODUCTS OF LOCAL INGENUITY

This section contains photographs of an assortment of vehicles or carts built or assembled locally in a number of countries in the developing world. Vehicle designs reflect the availability of local resources and craft expertise. Examples of both motorized and non-motorized vehicles are included. While mechanical parts (such as engines, gear boxes, etc.) and pneumatic wheel assemblies are usually imported or purchased second-hand, the bodies of the vehicles are invariably fabricated locally.

KENYA: Locally fabricated handcart.



KENYA: Factory made ox-cart.



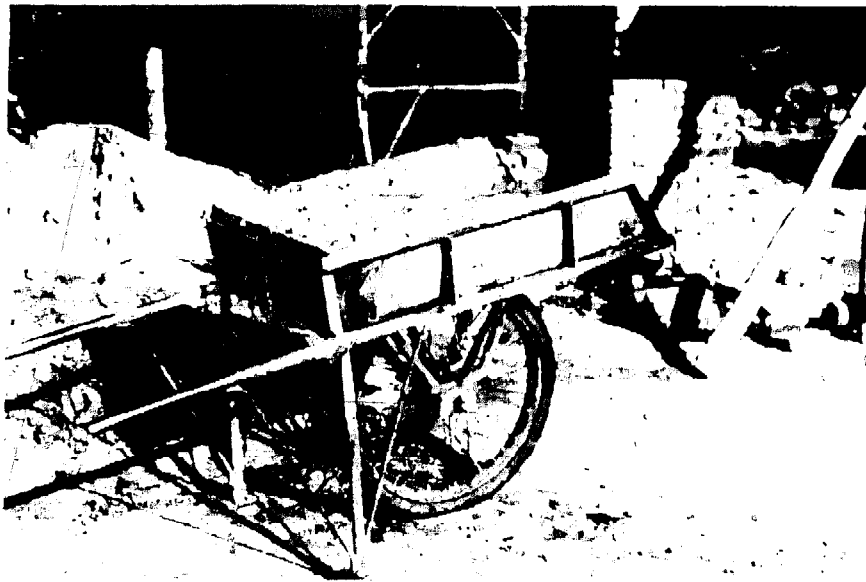
KENYA: Bicycle trailer.



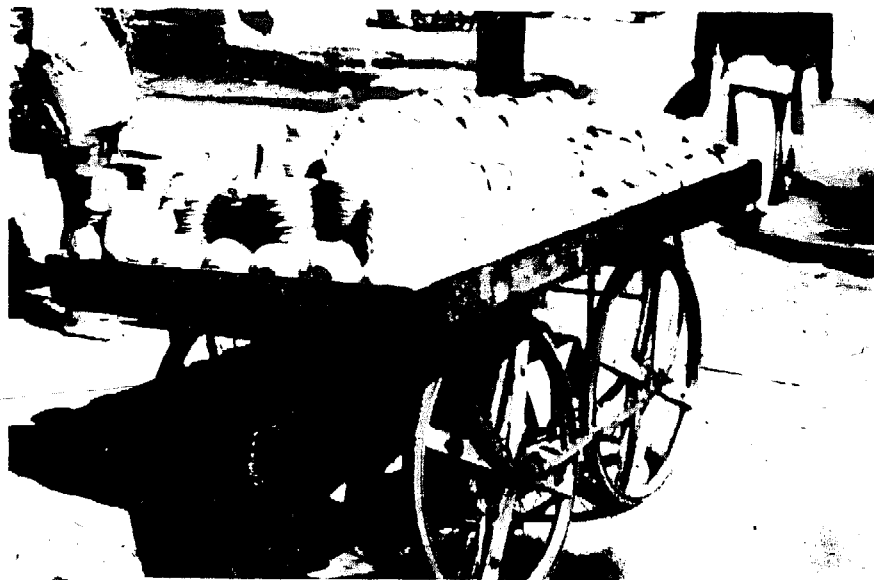
KENYA: Locally fabricated industrial handcart.



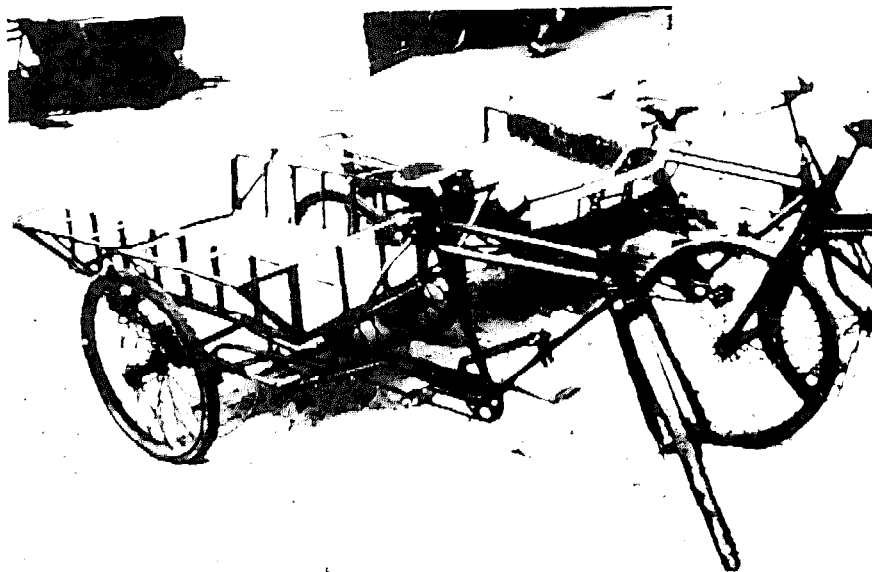
CHINA: Large-wheel wheel barrow with single wheel centered under the load.



CHINA: Four wheel pushcart.



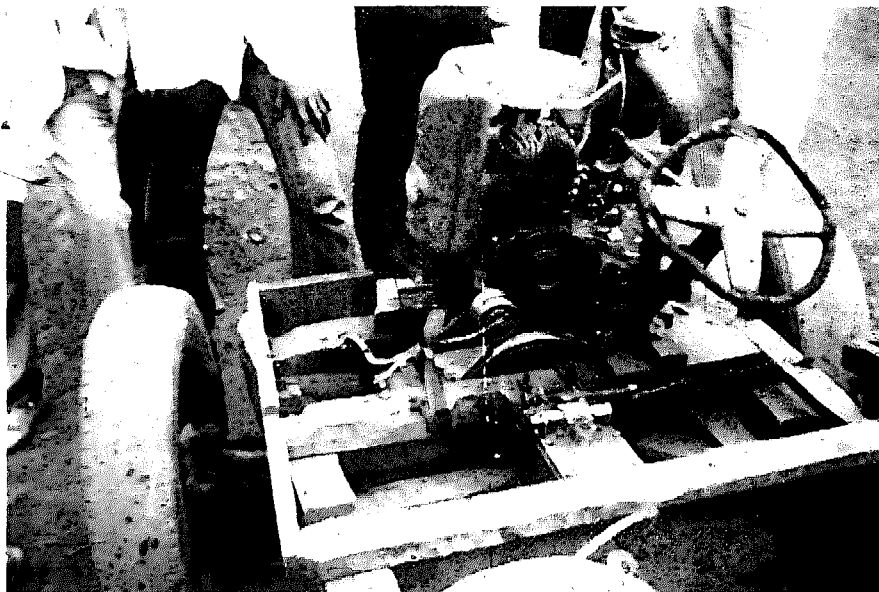
INDIA: Tri-cycle for hauling goods.



CHINA: Mono-cycle pulling single-axle cart.

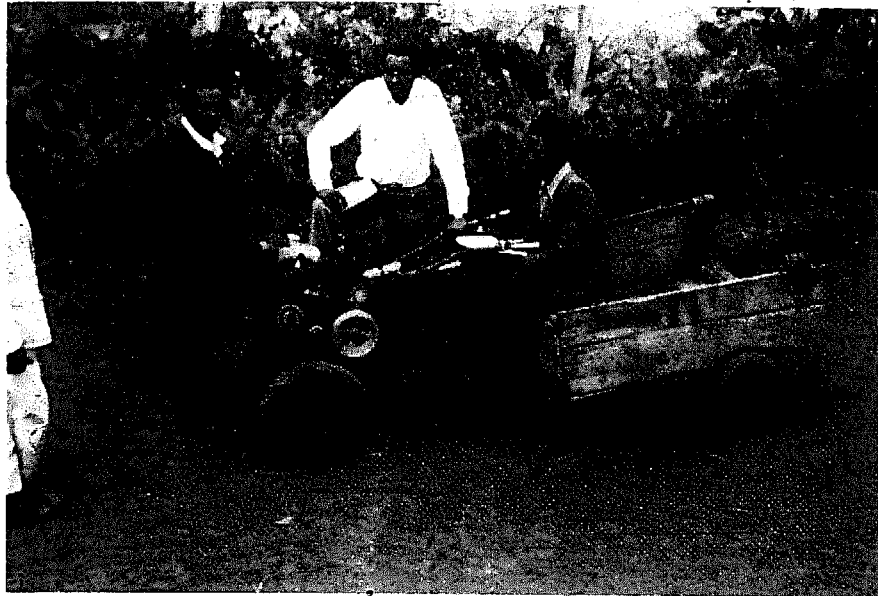


KENYA: Small truck made from spare vehicle parts.





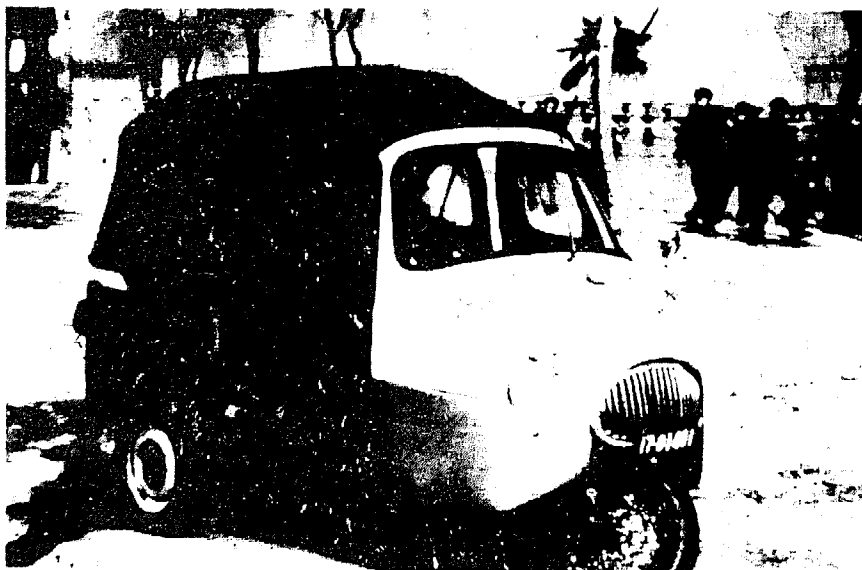
KENYA: Locally constructed cart pulled by single-axle tractor.



INDIA: Locally fabricated cart pulled by single-axle tractor.



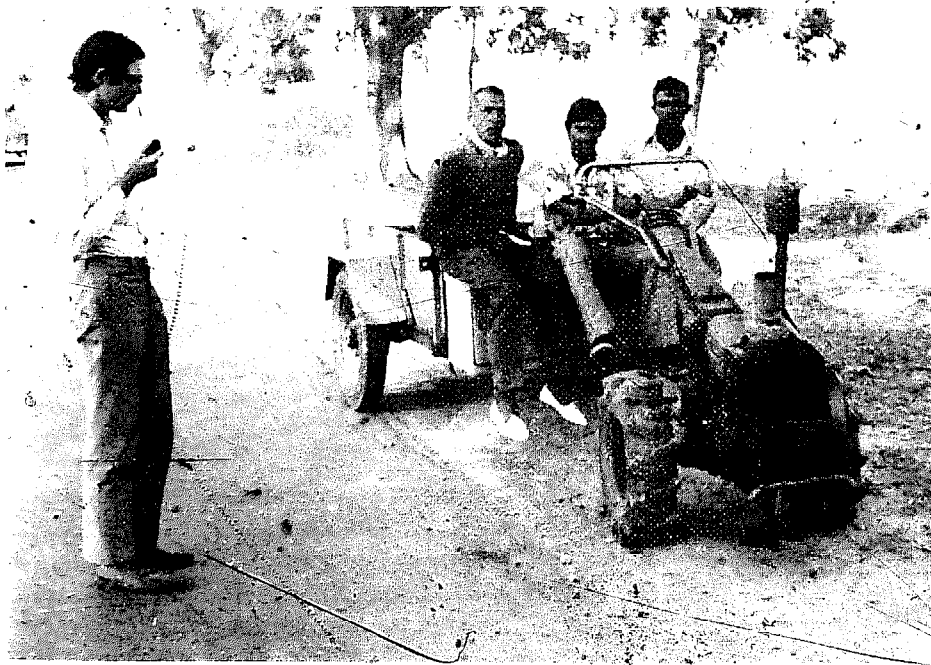
CHINA: Three-wheel vehicle constructed from basic motorcycle parts and local materials.



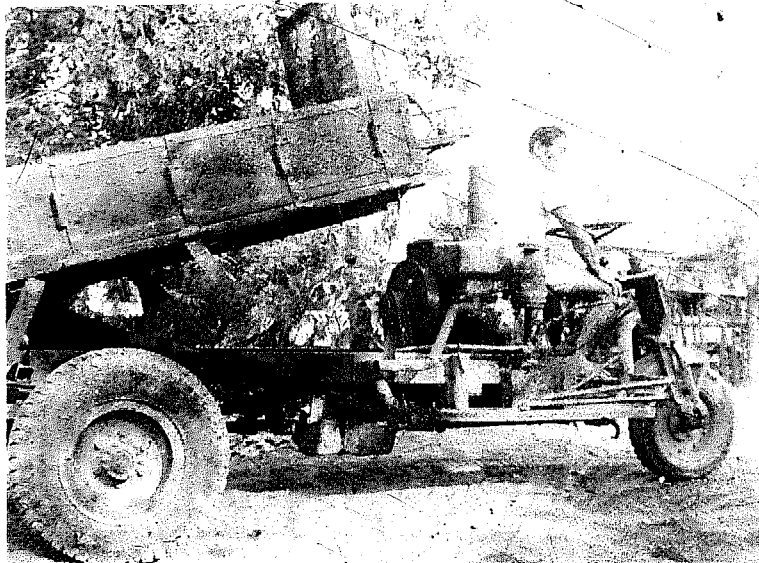
INDIA: Local three-wheeled taxi:



INDIA: Cart pulled by single-axle tractor.



TAIWAN: Three-wheel truck with single cylinder engine and flywheel



PHILIPPINES: Locally fabricated truck



VEHICLE SUMMARY SHEET

Vehicle Name:

Company Address:

Telephone:

Telex/Cable:

Description:

Specifications

weight	-	engine	-
length	-	speed	-
width	-	fuel capacity	-
height	-	fuel consumption	-
ground clearance	-		
wheel base	-		
payload capacity	-		

Comments on Maintenance, Productivity, "Appropriateness", etc.:

Cost and Present Status (as of \_\_\_\_\_):

VEHICLE SUMMARY SHEET

Vehicle Name:

Company Address:

Telephone:

Telex/Cable:

Description:

Specifications

weight -  
length -  
width -  
height -  
ground clearance -  
wheel base -  
payload capacity -

engine -  
speed -  
fuel capacity -  
fuel consumption -

Comments on Maintenance, Productivity, "Appropriateness", etc.:

Cost and Present Status (as of \_\_\_\_\_):