

Report Germany

1. Status Quo on Reuse Primary Packaging	2
2. Legal Laws for Reuse Packaging.....	4
3. Marking systems for reuse primary packaging	5
4. Standards on reuse packaging	6
5 Reuse systems for beverages	6
5.1 Mineral Water and bottled Table water.....	6
5.2 Fruit Juices and Fruit Nectars	8
5.3 Carbonised soft drinks.....	9
5.3.1. Distribution / Redistribution	9
5.4 Beer	10
5.5 Wine	10
5.6 Drinking milk	11
5.6.3 Types of reuse packaging in use	12
6. Reuse packaging for food.....	13
6.1 Products filled in reuse primary packaging.....	13
7. Non food	14
7.1 Cleaning and washing agents / body care	14
7.1.1 Type E refill systems for consumer reuse packaging	14
7.1.2 Type A/E systems for non-aromatic/neutral cleaning and washing agents.....	14
7.1.3 Type E glass packaging for refill in retailer's shops	15
7.2 Technical sprays.....	15
7.3 Paints	16
7.4 Motor oil	16

1. Status Quo on Reuse Primary Packaging

Reuse primary packaging is used in FRGermany for the following products:

- beverages
- diary products
- detergents / body care

and as refill systems for:

- technical sprays
- paints
- motor oil

All of the reuse packaging systems for non-food products can be considered niche systems because they do not have a quantitative relevance on the market. This is different with beverages. Here the dominant market shares are based on reuse primary packaging systems. For diary products and wine, well-established systems exist, but both of them only have minor market shares.

The consumption of industrial bottled beverages has increased in the decades from 1960 to 1990 very rapidly to a level of around 450 litres per capita and year (see Table FRG-1). The growth of juices is the biggest with 6 times as much being sold, mineral water has three times as much, while soft drinks and wine doubled their sales quantity. The growth in beer consumption was not as big, whereas milk is the only beverage which had to face an actual decline in their sales quantity.

The highest reuse rates actually occur with mineral waters (88%), carbonised soft drinks (77%) and beer (78%). 36% of non-carbonised soft drinks like juices and iced tea etc. and 28% of the wine are sold in reuse bottles. Milk maintains only 6,3% and yoghurt 9,9% of the market share in reuse packaging (1).

Reuse packaging systems were faced with a straight decline beginning in the mid 70's when one way packaging entered the market. It was especially milk, non-carbonised soft drinks and wine which were changed to one way glass bottles and beverage cartons. Pressure resistant packaging was able to keep up high reuse rates. Anyway FRGermany is the biggest of the one way primary packaging markets for one way glass and cans in Europe today (see Tables FRG-2, FRG-3 and FRG-4).

One way packaging for bottled water started to increase beginning in the late 70's with one way glass and plastic bottles. Plastic bottles declined again in the late 80's when mineral water started to be offered in cans. The percentages of cans and plastic bottles are actually under 2% each. The stable position of the reuse system, mainly in the case of mineral water, is based on a well-developed pool organisation which keeps more than 150 competing companies together (see chapter 5.1 and Annex 1).

The soft drink market is much more heterogeneous, with carbonised soft drinks being bottled by mineral water bottlers, breweries and specialised soft drink producers like Coca Cola etc. The

decline of reuse systems here was even faster and reached its lowest market share in the early 1990's (72%). After there was legal action taken against one way plastic bottles in 1989 (2), the introduction of reuse PET bottles brought a new increase to the reuse market share. The statistical increase which is based on filling quantities does not show the additional growth which occurred with one way cans and one way glass bottles' particularly in small volume packaging, since the new reuse plastic bottles are mainly big volume bottles 1- 1,5 litres. For carbonised soft drinks, cans are the leading one way packaging (13%), followed by one way glass (9%). Plastic bottles don't have a relevance on the market (see Table FRG 3). The latter actual changes were when big bottlers like Coca Cola started with one way PET bottles in 1998.

Non-carbonised soft drinks, mainly fruit juices and juice-based drinks, had to face the change in the packaging mix in the late 60's when one way glass entered the market with orange juice. In 1975, 46% of all non-carbonised soft drinks were bottled in one way glass (see Table FRG 5). When beverage cartons entered the market in the late 1970's, the market share of one way glass declined again. In the late 1980's, a renaissance of reuse glass bottles took place when wide mouth glass bottles were demanded for consumers for orange juices as well. Since that time, though, the reuse systems are again declining slowly, while beverage cartons still make up the dominant type of packaging (47%), followed by one way glass and plastic bottles with 12% each.

Like the case with carbonated soft drinks, the beer market, too, faced a steady decline of reuse bottles until 1995 (see Table FRG-4). In comparison to the constant overall growth of beer consumption in the 1980's, reuse packaging just could not take advantage of this trend. While sales of draught beer went down from about 26% in the 80's to 21% in the 1990's reuse bottles were able to win an additional market share. Since the early 1990's when cans became an instrument to drive out other competitors, reuse bottles were the losers again. Actually, 3,4 billion cans or about 18% of bottled/canned beer are being sold. One way glass makes up another 540 Million litres or 6%.

Wine packaging other than glass bottles is not very wellknown in FRGermany. The decline of reuse bottles took place in the mid 1960's and was caused by two main reasons. On the one hand, there was an increase in the amount of foreign wine bottled in glass bottles different than the German standard bottles which subsequently caused problems within the retailer retake systems and on the wine bottler's filling lines. On the other hand, the glass industry launched a big promotion-campaign "Ex und Hopp" (see picture 1 in Annex 14) to show the convenient use of one way glass. The recycling campaign begun years later (1972) which included a nationwide collection system that has been in-place since 1977 further promoted and stood up for the legitimacy of one way glass bottles.

The reuse system for milk and dairy products (yoghurt) was shut down toward the end of the 1960's, when beverage cartons and plastic jars revolutionised the packaging market. Beginning in 1986, the reuse glass bottles were able to come back to the market and even occupied a 9% market share in 1993 (see Table FRG 7). Since then, it is declining again to an actual figure of about 6%. This trend is caused by a decline in the sale prices for bottled milk and further growth of the market share of UHT milk.

Reuse glass jars for yoghurt and other dairy products came onto the market a little later than the milk bottles (1991) and still are able to keep a market share of around 9% (see Table FRG 8).

The basic trend from reuse to one way packaging is, to a big extent, based on the changes in the distribution channels for beverages (see Table FRG-9). As an example, in 1980, only 45% of industrial bottled non-alcoholic beverages were sold using retailers; the quota climbed up to 60% in 1988. The real losers are the HoReCa and home services, both of whom are basically connected with the reuse system.

2. Legal Laws for Reuse Packaging

Packaging has been a matter of interest within German politics since the early 70's. With the appearance of one way glass packaging and beverage cartons and the decline of reuse systems, the public and the government started to observe and to discuss this process.

One of the first activities of the UBA German Environmental Protection Agency which was established in 1975, was to analyse the ongoing process within the beverage packaging area. In the first German waste law of 1977 (3), the government was given the right to intervene into the market by way of government ordinances. Based on that measure, the government started to get the industries involved in agreeing to a standstill agreement to keep the reuse packaging systems.

Those agreements were enacted in an informal way in 1978.

In 1979/80, the government started to run a market test where reuse packaging and different kinds of one way packaging were tested in a competitive way in relation to their economic and environmental aspects. This market test conducted in Köln in 1980 was the start of the life cycle discussion in Germany.

With the change of the government in 1984, all of the activities concerning reuse packaging seemed to fall asleep for many years. In 1988/89, the discussion about LCA and reuse packaging started once again because of public pressure when, consumers began asking for reuse bottles mainly in the milk market.

Based on the revised packaging law (4), in January 1989 (5), the government started once again to reach agreements with the beverage industry which were later set down in April 1989 (6). Those agreements (6) were established as a final option before legal instruments could be set into force. The government analysed the developments which followed in the beverage industry and 6 months later came to the conclusion, that the industry did not keep their agreement.

After that statement, the government started to outline the first proposal for a ordinance to protect reuse packaging systems for beverages (7). This proposal came under pressure from a very angry lobby of packaging producers and fillers. The outcome was the German packaging ordinance of 1991 (8). This ordinance covers all kinds of packaging and lays down recycling targets for primary packaging. As a compromise within the conservative/liberal government, a constant quota of 72% to cover all primary beverage packaging was fixed. If this quota is not upheld by the industry, after one year and, after a certain second procedure of control, a compulsory deposit on one way packaging will be put into force.

The government in 1990 was empowered by the German Bundesrat (second chamber) to work out an additional proposal for an ordinance for the protection of the reuse systems. This ordinance, however, never was set into force by the conservative government.

Now in 1998, the reuse quota has fallen under 72% for the first time. Unless it is possible to revise the packaging ordinance within the remaining 1 ½ years, the following consequences will have to be owned up to:

The filler who sells beverages in one way packaging will have to charge a deposit of 0,50 DM for one way beverage packaging for a volume of up to 1,5 litres and 1,00 DM for packaging with a volume larger than 1,5 litres independent of the packaging material. Retailers will then have to take back the one way packaging and pay a refund. Meanwhile, they can contract a third company to do the retake in the area surrounding the retailer's outlet.

Two aspects will certainly influence the decisions of the retailers pro or contra reuse beverage packaging:

1. Do they want to run two retake systems simultaneously, with all of the consequences for handling, money flow and logistical control?
2. Who will derive a benefit from the deposits which are not recharged when the retake quota is less than 100% (which is the normal case)?

The first question will clearly be a resounded no. They will decide to operate only one retake system. Since it is possible to get rid of that entire retake and redistribution, retailers will vote for that. Offers to run retake systems for one way packaging are still on the negotiating tables of the can producers and the PET-bottle producers.

Their decision will therefore be pro one way packaging.

The profits resulting from deposits which are not returned is considered additional income. It will be between 0,05 to 0,10 DM (0,4-0,05 ECU) when the retake quota is between 80 and 90%, which is a typical figure taken from systems existing in Sweden and in the USA. The additional income which results plus the control of the back stream market for secondary raw materials will be a very strong incentive to run similar systems. The actual price for a 1 litre packaging is approximately double the amount of that benefit. It will at least cover the costs for the retake system.

3. Marking systems for reuse primary packaging

Compulsory marking/symbols do not exist for reuse packaging. Within the voluntary marking system of the "Blue Angel", one symbol for reuse packaging exists which can be used after contracting to the German EPA (UBA Berlin). The criteria for contracting are dictated by a list of obligations demanding:

- a retake system be in place
- no labels with metallic print colours

- Location of bottling (with postal code) must be printed on the label
- Reuse jars for food have to be part of a pool organisation

This label is actually used by some milk and juice fillers and as well for tertiary packaging.

Several reuse labels are owned by pool organisations (see therefore Annexes 2 and 10). These symbols are not compulsory within the reuse pools and just small amount of public relations is even done for these labels.

Third party labels are also offered and are to be used by contracting companies.

- Stiftung Initiative Mehrweg
- Welcome Werbeagentur GmbH

These labels are actually only used to a slight extent by individual companies. As these labels are profit-oriented systems which keep brand-mark ownership. They can cause a serious problem for common reuse markings in the future.

4. Standards on reuse packaging

There is a great number of public DIN-standards for reuse packaging in addition to DIN-standards for bottles and jars which are one way packaging by name but could technically be fitted to be reused (see Table 5.2.1 in chapter 5.2 of main report). In the past, some of these standards such as DIN 6198, DIN 6192, DIN 6110, DIN 6194, DIN 6075 have been used within open loop systems (Type D). Only very few of them are actually used actively by the pools.

All of the big beverage packaging pools in Germany use their own standard packaging (bottles plus crates) and in some cases they even use their own pallets. These private standards are the property of the pool organisations and are protected by registered trademarks and registered designs.

In the case of the beer bottle, the change from a public standard (Euro Bottel 0,5 litres DIN 6198) to a private standard bottle (NRW type 0,5 litres) took place within the past ten years. Small quantities of the 0,33 litre Ale Bottle (DIN 6192) and Steinie Bottle (DIN 6199) are still used in the market. Both bottles are then individualised by using company owned crates and are sold by just a few companies each, without exchanging the packaging.

A new standard especially for reuse packaging jars is under consideration (DIN 6110). This standard does not relate to any pool organisation.

5 Reuse systems for beverages

5.1 Mineral Water and bottled Table water

There are three types of bottled water sold in Germany. There is mineral water with or without CO₂ which stems from natural sources and there is bottled drinking water which is ultra-filtered

and then mixed with minerals. The total number of fillings of bottled water went up rapidly (see Table FRG-1). Within the last 15 years the total consumption has doubled and is now about 8,4 billion litres a year (see Table 2).

The average consumption of natural mineral water per person was 93,4 litres (1997).

There are 239 organised producers of natural mineral water who use about 550 sources. The production of natural mineral water has reached 7.515,4 Mio litres plus there are 2.076,3 Mio litres of soft drinks made from natural mineral water. 79% of the mineral water fillers are small companies (up to 100 Mio fillings per year), 13% have between 100 and 200 Mio fillings and only 8% are big companies (> 200 Mio fillings per year) (9).

The second player on the market is the Coca Cola Company with a group of 3 companies left who fill their trademark „Bonaqua“ a mineralised table water at 10 filling plants.

5.1.3. Distribution / Redistribution

The density of the geographical allocation of the mineral water sources in Germany is very high. In total, there were about 250 filling plants at work in 1998. In eastern Germany, drinking bottled water was not very common before 1990. Within the last eight years, some new sources have been built up which has meant that distribution from the west to the east has lost its importance.

Most of the natural mineral water is part of the local and regional distribution (average 50-70 km). Only 10-15 mineral water brands are sold nation-wide. Since they have to be bottled at the source, the average distribution distance is typically higher for these brands. An average distribution of up to 250 km has to be calculated.

The export of mineral water from Germany to other EU member states is not very common. Basically, it is restricted to some of the nearborder markets.

Imports into Germany are somewhat greater in number (see chapter 4.1 Table 4.1.1.1-3 of main report). This is true especially of France, Belgium and Italy. This seems to have to do with the large number of restaurants and pubs run by Italian owners and the way in which the high quality of French mineral water is valued by the restaurants.

All of the distribution channels are used for bottled water in reuse packaging. Only discounters and "take away" are more or less free of reuse packaging. The distribution is done to a great degree by way of direct delivery from the sources to the retail shops. Only very small quantities are distributed via the warehouses of retail organisations.

The retake is done by the retailers. Since all reuse systems circulate in reuse transport packaging (crate and pallets), this is a well functioning system.

Redistribution follows the same way back.

5.1.4 Reuse packaging pools for Mineral Water

There are two big pool organisations on the market. The first is GDB (Genossenschaft Deutscher Brunnen) (see Annex 1), the second is the Coca Cola company (see chapter 5.3 and Annex 4).

The GDB-pool was started in 1937 when the first standard bottle was launched. In 1953, there were still 57 different bottle shapes and 250 different wooden crates on the market. In 1969, the actually still used pearl bottle, which is the backbone of today's glass bottle pool was started. The pool actually keeps 2,7 billion reuse bottles and 150 million plastic crates.

5.2 Fruit Juices and Fruit Nectars

Fruit juices have to be sterilised within the packaging (hot fill) or may be filled in a cold aseptic filling facility. Cold aseptic filling is very new and has not yet been installed for reuse packaging plants to a great extent.

Fruit juices are produced as pure juices or watered down to nectars, or soft drinks containing fruit. The latter are filled when they are cold and are preserved with CO₂. They often are filled by producers of beer, mineral water or soft drinks.

Juices and nectars are filled by producers, who use fresh fruits as raw material input or by fillers who mainly handle with bought (imported) juice concentrate. Concentrate imports started in the 60^s with orange juice which actually continues to keep a market share of about 45% (1997). Just a few companies dominate that market while apple juice is still produced by hundreds of small and medium-sized companies.

5.2.1 The market share of reuse packaging

The actual share of reuse sales packaging for juices and nectars (without CO₂) is around 37% (1996), the rest is beverage carton and one way glass. One way glass declined in the last five years while the share for beverage cartons went up.

Until 1957, the German juice market was dominated by domestic production, mostly for apple juice and a small quantity of grape juice. Beginning in 1957, imports of orange juice were started with some degree of success. Practically all juices were more or less bottled in common reuse bottles, DIN standard bottles of the Vichy type 0,75 litre until 1968. With a big campaign in the glass industry in 1968, two of the big orange juice importers launched the start of one way glass bottles. This „innovation“ led to a rapid boom of one way packaging which helped to drive orange juice to surpass domestic juices in the late 70's

In 1972 (VDF) and 1974 (Dittmeyer) reacted by building up pools for reuse bottles (see Annex 2+3). These new reuse systems were only accepted for the domestic production. At about the same time, in 1974, beverage cartons entered the market. Within eight years beverage cartons were able to gain the number one position and send one way glass to the number two spot. The main reason for that breakthrough was that discounters appeared in the late 70's selling juices with reasonable prices and launching a new product (watered down juices) - "nectars" and "fruit drinks". The one-way boom led to a slump of 25% for reuse in 1980. Reuse did though even experience a short comeback, when in 1990, a new widemouth reuse bottle was launched by the big orange juice fillers who were heeding heavy pressure by the public. That bottle has been part of the VDF pool since 1992. Afterwards, the reuse quota went up to 39,6 % in 1993 and is now slightly lower at 37,2 % in 1996.

5.2.2. Distribution / Redistribution

There are about 400 producers of bottling juices. 15 companies distribute to the national and European market. 40 companies serve regional markets with an average distribution area of 80-100 km. The rest are smaller companies serving local markets mainly in the south of Germany.

Small producers sell by way of direct sales to private households, caterers and small retail shops. The big and medium sized companies sell via national retailers with a national or European distribution. The distribution via discounters is dominated by less than 10 companies. All of the reuse systems use reuse crates which leads to a retake at the point of sale. No additional retake/collection systems are used. Redistribution goes to distribution and vice versa.

5.3 Carbonised soft drinks

Carbonised soft drinks are not conserved by heat treatment but with the atmosphere created by CO₂. Therefore, the packaging must be gastight and must withstand the high pressure inside.

Carbonised soft drinks are produced by a large number of companies within three different branches; the breweries, the mineral water fillers and the specialised soft drink producers. 46% of soft drink fillers are small companies with less than 20 employees, 30% have 20-99 employees and 24% of the companies have 100 and more employees (10).

5.3.1. Distribution / Redistribution

The distribution of soft drinks uses all of the distribution channels. Since there are so many different producers (mineral water sources, breweries, juice producers and specialised soft drink producers), the distribution is widely differentiated. Unlike most other European countries, the role of beverage wholesalers is still important.

The geographical density of carbonised soft drink fillers is very high. The market leader for cola beverages (Coca Cola) concentrated its' filling plants very rapidly in the last ten years. In 1987 when the legal quarrel about packaging in Germany begun, Coca Cola ran 68 filling plants in West Germany. Actually, now there are only about twenty plants left even though the market has expanded greatly in East Germany.

There is a little distribution across the borders. Most soft drinks are sold locally or regionally. Only very few brands of cans are sold nationwide and reach average distribution distances of more than 300 km.

Most of the reuse bottles are sold in crates for consumption at home. Crates and single bottles are handled in big retail shops with retake machines or by hand.

The sorting of the crates which come from different brands is done by the wholesalers. The sorting of the bottles to specific crates is done by the retail outlets. Crates with a mixture of different types of bottles are sorted at the filler's plant.

5.3.2 Types of reuse packaging in use

Actually four big pools exist on the market. These are:

- the Coca-Cola pool (see Annex 4)
- the AMG pool (see Annex 5)
- the GDB pool (see Annex 1)
- the NRW pool (see Annex 6)

Along with these pools, some companyowned reuse bottle systems are on the market. The market share of these systems totals under 15%.

5.4 Beer

Beer is a selffermenting product, which can be bottled as a fresh product with a storage time of about three months or it can be pasteurised within the bottle which extends the potential time for storage up to one year. Beer is brewed in Germany in about 1.260 breweries while about 800 of them bottle beer for sale. 21% of beer production is sold as draught beer for HoReCa. 1.200 of these breweries have less than 100 Mio fillings per year and serve the local or regional market. 18 breweries are mediumsized and 33 produce more than 100 Mio. litres per year (9). 60% of the total production is bottled in reuse glass bottles while 19% is sold in one way glass and metal cans. The rest is draught beer (see Table 4). Consumption per capita is very high with a quantity of around 130 litres being the average.

5.4.1. Distribution / Redistribution

In Germany, there isn't a „town“, which doesn't have a brewery. The distribution range of most of the beer is under 50 km. The national distribution of brandname beers (TV beers) causes very long distribution distances of up to 400 km on average.

All of the retail systems are used, but the small breweries often run their own distribution system, which makes it possible for them to run individual reuse systems. When the distribution is run via wholesalers the sorting of the crates is also done by them.

5.4.2 Types of reuse packaging in use

Until 1989, there was more or less a unique pool of standard bottles and crates within Germany. Both followed DIN-standards. Crates had the same shape but were different colours and some even had company names printed on them. In 1989, some companies started to launch new individual crates (individual shape, new measures). Up until 1997 most of the breweries followed this trend.

In reality, two standardised bottles 0,5 (NRW) and 0,33 l (Ale DIN) cover about 90% of the reuse market but all of them, with the exception of a small pool (UNICA), are distributed in individual crates. In that situation, the logistics for most of the reuse packaging is based on individual (Type A) systems with a slight advantage that the sorting of bottles is minimised to a certain degree.

5.5 Wine

Wine consumption in Germany is very constant and is on a level of 1.800 Mio litres per year or about 26 litres per capita. 640 Mio litres are domestic wine, and 1.160 Mio litres are imported wine. About half of the imported wine is bottled in Germany.

In 1997, 42.170 wine growers in Germany organised themselves in 290 cooperatives with 170 of them running their own central filling facilities (11).

The number of importing companies is also very high, but is not registered anywhere. The number of companies importing bulkware and running filling plants in Germany is estimated to be 100 companies. Many importers use contract filling at domestic cooperatives.

Some foreign (French) filling plants are located directly at the border and only fill wine for export to Germany and the East.

5.5.1. Distribution / Redistribution

The geographic allocation of wine growers is concentrated in the Rhein valley, the Mosel/Ahr area and Neckar and Main area in the southwest of Germany.

Importers are also located in the growers' areas with some exceptions in northern Germany (Bremen, and Hamburg).

Most domestic wine is consumed in the area of production. In the wine growing areas, a lot of wine is sold by direct sales to the consumer or HoReCa. Along with that, all distribution channels are used. Reuse bottles are basically used for direct sales. In southern Germany (south of the Main river), reuse bottles for wine are welltraded by retailers.

Among discounters, in particular, imported wine is sold without differentiating where it was filled, but selling it in one way bottles and beverage cartons.

5.5.2 Retake / Collection of empties

Using direct sales and his own logistics, retake redistribution is controlled by the wine grower/filler himself. In southern Germany, many co-operatives distribute reuse bottles in standardised plastic crates, in which case, redistribution runs parallel to distribution. Most of the wine is delivered by fillers to the central warehouses of the retailers who then distribute it using their own logistics.

In some areas, retake is organised in Type F systems with collection done by separate bottle banks/containers. This mixture of bottles is sorted and cleaned and offered to both domestic and foreign (France) fillers.

5.5.3 Reuse packaging in use

Traditionally, there are two shapes of wine bottles used in Germany (Schlegel, Rheinwein) and some regional shapes restricted to a certain wine growing area (Bocksbeutel etc.). Most of these traditional bottles are used with wooden crates or with plastic crates.

5.5.4 Type F collection system for reusable wine bottles

In areas, mainly in the north of Germany, where retailers do not take back wine bottles at all some regions (Bielefeld, Herford) have independent collection schemes for wine bottles. The extent of these collection systems is not that large but it does cover a wide range of bottles, which are used for foreign wine bottled in Germany and/or imported in bottles.

Since Type F systems can not control retake, they must handle „all“ of the bottles on the market. To obtain an economic benefit, the goal is to select and trade as many types of bottles as possible. This is why about 40 types of bottles which follow the technical standards of the big packaging glass producers comprise the main mass flow. Additionally, along with that low price mass flow, a certain range of high value glass bottles are selected in smaller quantities.

5.6 Drinking milk

1997 milk consumption in Germany totalled 5,5 billion kg, which means there was an average consumption of 67 kg per capita and year. 4,96 billion kg are packed in sales packaging. Only

30,56% (1.517 Mio kg) is fresh, pasteurised milk, the rest is UHT milk. Sterilised milk comprises a very small quantity in the market.

The markets for one way packaged milk and milk bottled in reuse packaging are divided. UHT milk and pasteurised milk in pouches are sold with very little profit and are even hit with price dumping by the retailers. They are one of those products which are used for competitive daily advertisements by most retailers.

Consumer prices of 0,69 DM to 0,99 DM for UHT milk are common while producer prices for milk direct from the farm cost 0,60 to 0,64 DM per kg. Pasteurised milk in beverage cartons, which is also rapidly declining, is sold for 0,99 DM to 1,29 DM per litre. Milk in reuse bottles is sold as first quality milk in the range of 1,29 DM and 1,99 DM per litre.

As in most other European countries, the number of companies which process milk is declining very rapidly. The number of fillers using reuse bottles and/or jars is actually 32.

The former (39) reuse filling plants in eastern Germany were been closed down after 1990. Only 4 new plants have been built since then.

The import and export of bottled milk in reuse packaging is not very great. It is restricted to some very small quantities of special products (green goods) in an exchange which occurs near the national borders.

5.6.1 Market share of reuse packaging

Reuse packaging is used on the market mainly for pasteurised/fresh milk of „high quality“ and only a little for UHT milk.

In relation to the total amount of drinking milk consumed (5.503 million kg), only 6,3 % (0,314 million kg) is packed in reuse bottles (see Table 7). The official quotas which are dealt with in the German packaging ordinance are only based on the production quantity of pasteurised/fresh milk and is therefore calculated with 20,8 %.

5.6.2. Distribution / Redistribution

The geographic allocation of reuse filling plants is shown in map 4. Most of the filling capacity is located in south Germany (estimated to be around 75%). Distribution of most (20) plants is regional. 5 plants distribute nationally. Very small quantities are exported in reuse bottles to northern Italy and Austria.

Distribution actually follows the big retail chains. The quantity of milk which is delivered directly from the dairy to the retail outlet has been declining since the big retail companies built up their own capacities of cold-storage depots and van fleets equipped with refrigerated coolers. The distribution distance is therefore increasing greatly.

5.6.3 Types of reuse packaging in use

Actually three contract pools and some small companyowned closed pools exist;. one pool for UHT milk and two for fresh, pasteurised milk. In 1986, only one open pool (MVR, Köln - Type C) was started whereas five companyowned closed pools (Type A) Südmilch, Stuttgart / CEMA, Augsburg / Milchwerke Bückeburg / Scheitz, Andechs / Hansano, Hamburg tried to establish their own standard on the market. This senseless action which was highly supported by

the glass industry caused a high additional lost of investment which led to the demise of two of the dairies involved.

When Südmilch Stuttgart was put under pressure in 1990, it opened up it's own company owned pool to an open pool (known today as MMP). The other four were given up or changed over to the MMP pool. The MMP pool is now the standard in south and east Germany, while the MVR pool is the standard in west and north Germany.

Along with the reuse bottle systems (Type A/C), some dairies started selling via „steel cows“. The Type E system uses refillable tanks of 10 to 500 litres or 20 litre one way pouches which are used to refill consumer owned bottles in retail shops (see Annex 12).

6. Reuse packaging for food

6.1 Products filled in reuse primary packaging

Yoghurt and some other dairy fresh products (cream, pudding, deserts, fresh cheese etc.) are filled in reuse packaging. Most of them are filled in MMP jars and 0,5 l bottles (see Annex 10). All of these types of packaging are sold via the classic retail chain except for the discounters. Dairy products are filled by a group of about 10 MMP pool contractors. Many brands are filled by contract fillers of the same group.

Domestic honey (Deutscher Honig) is produced by a few thousand small apiarists organised in a national organisation. Most of them use brand glass jars from that national organisation.

Hot meals (menus) are delivered by mobile catering services to private people and companies. As an alternative to the one way aluminium and plastic packaging, reuse packaging systems have been launched in the market.

In 1997, 140.000 tons were used in reuse jars which was a slight increase (see Table 8).

7. Non food

Reuse systems for non food articles are not very common. Some companies (pioneers) established different reuse systems for the following goods:

- cleaning and washing detergents / body care
- all kind of technical sprays
- paints
- motor oil

Many reuse packaging systems have been tested on the market, but only those which have had success and still on the market shall be described here.

7.1 Cleaning and washing agents / body care

The total range of cleaning and washing agents and body care products are predestined for filling in reuse packaging. Since there is a very high variety of different packaging consisting primarily of plastic bottles, retake, sorting and reconditioning is very difficult. Another problem is that the aromatic contents can move in the plastic packaging material and back into the product filled in secondly.

Some solutions may be:

1. closed loop systems for each product or use of consumer owned packaging where consumers are responsible for selection of product/aromatics
2. use of products with little or the same aromatics
3. use of glass packaging which would not be very convenient.

All three strategies have been tested and developed to a certain extent.

7.1.1 Type E refill systems for consumer reuse packaging

Cosmetics and body care products are offered in dispensers for refill in retail shops especially by hair dressers and specialist retailers / drug stores.

Several dispenser systems are on the market usually in combination with a delivery contract of high quality cosmetics. Products are delivered in reuse bulk packaging (tanks, buckets) The consumer reuse packaging is of high quality and durability.

The address of one such supplier:

Sulamith - Mußler, Blocmatt 7, Baden-Baden

7.1.2 Type A/E systems for non-aromatic/neutral cleaning and washing agents

Washing and cleaning agents do not have to have aromatics as one of their ingredients. A wide range of 25 products are offered as bulkware combined with dispensers for self-service refilling of the consumer reuse packaging. Products are typically „environmentally friendly“ and cheaper in price than one way packed products of the same quality. Often concentrated products are sold in these systems which keeps the packaging amount down. A address of a supplier e.a.:

- Klar, Dr. Stewer&Co., Rheinstr. 57, 47799 Krefeld

7.1.3 Type E glass packaging for refill in retailer's shops

Hair shampoos with very different aromas are offered in dispensers which can then be filled in glass bottles, which can be cleaned easily by customers themselves. Therefore, it is possible to change aromas.

A address of one supplier:

- LOGONA, Zur Kräuterwiese, 31020 Salzhemmendorf

7.2 Technical sprays

Different kinds of technical sprays are sold in one way cans which are filled with aerosoles. The emission of environmentally harmful gases and the problem of residues within the cans (on average about 10-20%) cause many problems in addition to the high amount of waste created by these convenience products. Furthermore, the prices are very high.

All three problems can be solved when bulkware is filled in reuse spray cans at the users own workshop or at the retailer's outlet.

7.2.1 Organisational structure

In most cases these reuse systems are individually organised. The facilities are installed at the user's place. The customer has the control over the use.

Some addresses of suppliers:

- ECON AIR, Daimler Str. 12, 32312 Lübbecke
- System Tec, Werner von Siemens Str.3, 68649 Groß-Rohrheim
- BiB, NL-Roermond

7.2.2 Technical standard

Bulkware is delivered in reuse barrels or reuse IBCs. A filling facility is installed and owned by the user. Pressed air is normally use as pressure input in the cans. When there are corossive products, gases like Co2 or NO2 may be used.

7.2.3 Logistics of redistribution

The redistribution of bulk packaging follows distribution and vice versa.

7.2.4 Number of fillings per packaging life

The number of fillings is very high because the cans are constructed for industrial use and must fulfill the requirements for pressure tanks. Some parts which are less durable like spray heads can be changed very easily.

7.3 Paints

Wall paint is commonly sold as ready-mixed dispensation paints. The plastic buckets which are commonly used are reusable but are used as one way packaging because of a lack of redistribution and reconditioning facilities.

An address of one such supplier: Conti Petrol GmbH, Hammerstein 13, 45479 Mühlheim

They are running a company owned reuse system Type A . Reconditioning is done at the filling plant.

7.3.2 Technical standard

Common plastic buckets with closures are used.

7.3.3 Retake / Collection of empties

Emptied buckets are taken back in exchange at delivery. Most of Conti Lack's customers are companies.

7.3.4 Number of fillings per packaging life

Plastic buckets can be used 5-10 times. The numbers for the retake rate is not available.

7.4 Motor oil

7.4.1 Organisational structure

Motor oil is normally sold in one way plastic bottles and small plastic tanks. Emptied packaging causes problems because there are residues left inside and a great deal of plastic is used for the rigid packaging.

A new dispenser system is located at service stations, where different types of motor oil can be obtained (self service), filled in the consumer owned bottles/tanks or filled in reuse bottles which can be left at the dispensers after use.

An address of one supplier: DEA Mineralöl AG, Hansastr. 3, 47058 Duisburg

7.4.2 Technical standard

As there is no circulation of a certain type of reuse packaging, there is no need for standardisation.

7.4.3 Number of fillings per packaging life

Plastic bottles for self service at the service station can be used Reuse of primary packaging hundreds of times. The oil is delivered in standardised barrels / bulk tanks to the service station.

Sources:

- (1) UBA /GVM: Einweg- und Mehrwegverpackungen von Getränken - 1997, Berlin/Wiesbaden, Nov. 1998.
- (2) Verordnung über die Rücknahme und Pfanderhebung von Getränkeverpackungen aus Kunststoff vom 20.12.1988, BGBl. I S. 2455), Bonn, 1988.
- (3) Gesetz über die Beseitigung von Abfällen (Abfallbeseitigungsgesetz AbfG) vom 5.1.1977, BGBl I S. 41, Bonn 1977.
- (4) Ermächtigung zum Erlass einer Verpackungsverordnung nach dem Gesetz über die Vermeidung und Entsorgung von Abfällen (Abfallgesetz AbfG) vom 27.8.1986, BGBl I S. 1410, Bonn, 1986
- (5) "Entwurf der Zielfestlegung der Bundesregierung zur Vermeidung, Verringerung und Verwertung von Abfällen aus Verpackungen für Getränke" Bonn, 17.1.1989
- (6) "Zielfestlegung der Bundesregierung zur Vermeidung, Verringerung und Verwertung von Abfällen aus Verpackungen für Getränke", Bonn, 26.4.1989
- (7) Referentenentwurf einer "Verordnung über die Rücknahme und Verwertung von Verpackungen (AbfVRückV), Bonn, 23.4.1990.
- (8) Verordnung über die Vermeidung von Verpackungsabfällen (Verpackungsverordnung - VerpackV) vom 12.6.1991, Bundesgesetzblatt, Jahrgang 1991, Teil I, S.1234 ff
- (9) Brauwelt, 1998, Nürnberg, 1998.
- (10) BDEI, Statistik 1996, Bonn, 1997.
- (11) dwv, Deutscher Weinbauverband e.V. - Zahlen, Daten, Fakten 98, Bonn, 1998.

