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Official publication of the British & International Golf Greenkeepers Association
SEPTEMBER 1993

GREENKEEPER

International

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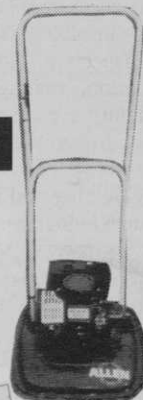
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Faces and places



■ The Rt. Hon. Viscount Whitelaw, president of BIGGA, officially opened the new Sedburgh Golf Club last month, five years after the old course, high in the Cumberland fells, had been deemed virtually unplayable by members. Bruce and Lorna Wilson and John and Jean Handley, whose adjoining farmland

hosts the new Maxel designed and constructed course, fought a long battle with planners and conservationists before the first sod was turned. Viscount Whitelaw, who is Sedburgh's first honorary vice-president, opined that there would always be those who claimed that golf courses were a threat to wildlife, but as long as more and more people wanted to play the great game, there would be a need for new courses. He also praised the sympathetic design, which utilises natural features to the full, appearing as if it had 'always been there'.

■ A new specialist group has been formed by the Institute of Agricultural Engineers (IAgrE) to cater for those involved with leisure, sport, and the environment – with an engineering requirement or demand. Named the Amenity and Ecological Engineering group, its formation reflects changes taking place, with farmers diversifying into the leisure and sporting sectors and environmental concerns taking precedence. As a result, agricultural engineers are being called upon increasingly to research, educate, advise, design, develop, manufacture and supply equipment and services within areas other than food production.

The agricultural engineering profession is well placed to respond, first because it has long been involved in environmental manipulation through drainage, erosion control, land reclamation and levelling, water storage and irrigation. Second, it is the only engineering discipline with a scientific base in biological science. The new group aims to embrace all aspects of biological science and 'clean' technology: the creation, management and maintenance of sports and amenity areas and the design and management of landfill sites. In conjunction with BIGGA at BTME in January 1994, the group will hold its first public function, a seminar on engineering and its applications within amenity and the golf course industry.



■ Readers may remember Gordon Mitchell writing in Greenkeeper International earlier this year after they had a break-in at the club's equipment store – the story goes that the intruders were eventually spotted in Leek High Street wearing John Deere caps, removed during the break-in, couldn't explain where they'd got them, and were subsequently arrested and charged.

Among other equipment, the club runs a John Deere 2243 greensmower, 1070 compact tractor and 305 five-gang fairway mower – hence the visit to John Deere's HQ, to update themselves on the parts service and new machines for the golf course – and to be presented with some new hats! Our picture shows the suitably attired Gordon, right, with assistant Rob Pickford.



■ A cautionary tale for those who are forced to chase around the course – Ian Holoran, who assures me he certainly wasn't 'doing a Mansell', came across two golfers blocking his way on the course at Middlesbrough, braked hard on a sloping path and slid less than delicately into a very muddy stream. The result? A well bent Greens King and a

shaken though thankfully unhurt Ian Holoran. The trade, no doubt, were swift to make unscheduled sales calls!

■ The chance to win an expenses paid trip to attend the 1994 Golf Course Superintendents Association of America (GCSAA) Convention in Dallas, USA and £1000 worth of free Farmura products for the golf course awaits the winner of the Blazon 'Better Way to Spray' photographic competition. Second and third place runners-up will receive £500 and £250 worth of free Farmura products respectively.

The competition is open to greenkeepers and turf managers and each entrant will receive a free 110 camera and film, although entrants may use their own camera if they wish. The photographic theme is 'Summer on the Golf Course' and entries will be judged by a panel of experts chaired by David White, editor of Greenkeeper International. Your winning entry could well end up being featured in Greenkeeper International, certainly it will be displayed at the 1994 BTME in Harrogate. For information call 0233 76241 or speak to a Farmura products distributor.



■ At the All Seasons Golf Day staged at Foxhills, Jack McMillan, left, received a special award in recognition of his recent MBE, presented by Terry Huntley, chairman of the Surrey section of BIGGA, and John Hobbs, sales director of All Seasons Dressings.

■ With the expansion in golf courses through the country, the GTC approved Warwickshire College has taken steps to increase its provision and has just completed the construction of a third green on the college golf course. The work fits in perfectly with the curriculum as students get hands-on experience in the specialist tasks involved during construction, while at the same time the college expands its facilities, thus increasing its resource base. Sponsorship for the green construction has been important and the college has benefited from collaboration with a number of companies including Boral Lytag Ltd, Greenkeeper Ltd, Greenbase and AquaPipes Ltd.

■ Jason Hampton, 22, of Cartmel, Cumbria, has been awarded The Rufford Cup as best overall student following his three year BTEC National Diploma course in Golf Course and Sportsground Management at Sparsholt College, Hampshire. Jason, formerly from Brixham in Devon, plays golf with a handicap described as 'low' and gained work experience during the course duration at the Woodbury Park Golf and Country Club.

At the college's presentation ceremony, The Lord Sainsbury, KG., wished students of this 'most prestigious' college every success and recommended that, in their future positions, they should always remember the customers for their goods and services. "The customer should always be given good value, this being the sum total of quality and price".



■ Jimmy Richardson, secretary of BIGGA's North East section, has taken on the formidable task of managing the 180 acres that form Matten Hall Golf Club, located 20 miles west of Newcastle upon Tyne. Built by Golf Design and Management and designed by 'Mr Happiness', pro golfer Mark James, the 6600 yard course will be in full play by the autumn of 1994, with nine holes opening next spring.



■ David Culpin has been appointed John Deere's area manager for the whole of Ireland. He replaces Chris Meacock, who had previously taken up a similar role in the East Midlands. David became Agricultural Engineering Student of the Year while attending Caythorpe College and has been a member of the British Society for Research in Agricultural Engineering (now Silsoe Link). He lives in Palmerston, Dublin.

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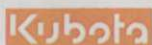


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BIGGA: BUILDING A BRIGHTER FUTURE

Education

Video is a first for BIGGA and industry



The launch of BIGGA's first turf management training video, wholly sponsored by companies contributing to the Greenkeeper Education and Development Fund, took place at the Open Championship in July.

This video, the first in a planned series, focuses on the spray application of pesticides, fertilisers and the other chemicals within a golf course environment. Entitled "Setting the Standard in Spray Application", topics include the integration of chemicals with mechanical and cultural practices, the matching of power units with sprayers and defining the standard of equipment and course requirements.

The film details the progress of a typical sprayer operation from start to finish demonstrating the essential Health and Safety requirements and the current Codes of Practice. The complete calibration procedures for a boom sprayer is featured, together with the correct methods for handling, measuring and mixing chemicals prior to application.

The video has already been acclaimed as a major training aid for all those involved in turf management.

Filming of the video took place at the Belfry Golf Course, venue for the 1993 Ryder Cup.

More than 1,500 free copies have already been sent to course managers and head greenkeepers, who are BIGGA members, at golf clubs throughout the UK.

Additional copies of this most informative video – which would help both golf course members and committee members to understand the skills involved in maintaining golf courses – are available at a cost of £18.75 (BIGGA members) or £23.75 (non-BIGGA members), inclusive of VAT, postage and packing. Send your cheque or postal order made payable to BIGGA to: British and International Golf Greenkeepers Association, Aldwark Manor, Aldwark, Alne, York YO6 2NF.

■ The Toro/PGA Student Greenkeeper Award regional finals have now been scheduled. The Welsh final has already taken place and the five other regional finals will take place from 9–13 September at various college locations throughout the country. The eight finalists to include two from Ireland will be featured in the next issue of Greenkeeper International and the winner being chosen at the National final at BIGGA Headquarters on 10/11 October. Good luck to all the finalists.

■ If you have not yet attended one of BIGGA's Management Courses, please consider doing so this year and getting booked in Year 1 now!

Years 2, 3 and 4 are filling up rapidly as these delegates have already gained the benefit from attending one of these courses and want to come back for more! It's not too late to book so complete the green registration card in this issue of the magazine and send to HQ to reserve your place.

■ Last month members were advised of changes taking place regarding the provision of financial services and that details would appear in this issue of the magazine. At present details are not yet finalised but should be so for the October issue of Greenkeeper International. Meanwhile, members who need further information or advice should contact either Neil Thomas or John Pemberton at BIGGA HQ on 0347 838581.

GOLF COURSE IRRIGATION

A NEW STUDY

by PAUL HERRINGTON and MARTINA HOSCHATT

This study, undertaken over 1991-3 by the Department of Economics at the University of Leicester to assess the possible implications of climate change for the demand for water, concerns itself with both the public water supply (PWS) and direct abstractions (DA's), concentrating on those demands thought to be especially sensitive to climate.

Mr John Shildrick of the BTLIA helped in the compilation and distribution of a questionnaire to a sample of members of BIGGA, and five NRA regions in the south and east of England (Anglian, Southern, South West, Thames and Wessex) were targeted as the area most susceptible to water scarcity problems. A questionnaire was produced, the objectives of which were:

- to gain a factual picture of present golf course irrigation in terms of quantities, sources, uses and timing;
- to assemble information about annual water costs;
- to ascertain the possible response to a hypothetical doubling of water prices, from both PWS and DA's;
- to invite comments about the possible implications of global warming for course water use.

The questionnaire was sent to 298 BIGGA members and there were 89 returns (30%), covering irrigation activities on 114 golf courses: 95 18-hole (83%) and 19 9-hole (17%). The consensus estimate is that there were about 1600 golf courses in England and Wales in 1992. Assuming that half of these, 800, were located in the five NRA regions, returns represented 14% of courses in the south and east. The returns were from 21 counties, from Cornwall across to Lincolnshire; of these 35% came from Hertfordshire, Kent and Surrey.

Size of Golf Course Complexes

One of the 89 responses gave information about a 64-hole complex (14000 yards, in Surrey), one for a 39-hole complex (15000 yards, in East Sussex), nine for 36-hole complexes, and twelve for 27 holes. Of the remainder, six were for 9-hole courses and sixty for 18 holes. 18-hole courses ranged from 5300 to 7100 yards. Numbers of rounds played per year

ranged from 2500 to 80000. The 44 18-hole courses providing use information revealed an average of 44250 rounds per year.

Irrigation Systems and Uses

Virtually all courses provided information of the type of irrigation system used. 76% made use of automatic systems with pop-ups, 12% had manual installations (with sprinklers working from hose-points), and 11% had mixed automatic and manual systems. Just one course had no fixed installation at all, and two reported travelling sprinklers in addition to an automatic system. As recently as 1987 it was reported in Turf Management that as many as 11% of courses had no form of irrigation system. However, the regional breakdown of that 11% is unknown.

Most courses (56%) irrigated both greens and tees in a climatically average year; a further 27% watered greens only, 7% irrigated greens, tees and approaches, and the remaining 10% watered fairways in addition.

Sources of Water

We obtained information on sources of irrigation water for 100 'courses', a course sometimes defined as a 27-hole or larger complex. 33 courses reported more than one type of source, 'types' being defined as • PWS (direct) • PWS (into storage first) • DA's (direct) • DA's (into own storage first).

The various possible source combinations are best summarised in the Venn diagram shown as Figure 1.

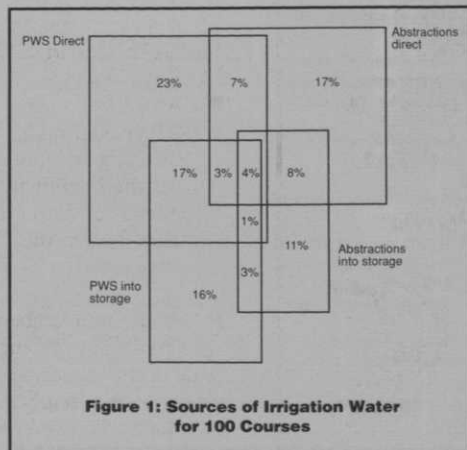


Figure 1: Sources of Irrigation Water for 100 Courses

This shows that 64% of courses made use of mains water (= PWS); of these 30% used PWS only directly, 19% PWS only for storage and 15% a mixture of directly and for storage. 54% of courses made use of direct abstractions; of these 24% used DA's only directly, 15% only for storage and 15% a mixture. 47% of courses used only direct supplies, of one sort or another, while 30% irrigated only from storage and 23% used a mixture of the two. Of the 39 courses using abstractions directly, 58% abstracted from boreholes and 42% from a river or lake.

Quantities of Water Used for Irrigation

We sought information from courses concerning the quantities of water used for irrigation over the years 1990, 1991 and 1992. Table 1 shows the resulting average figures. (In Table 1 and throughout this section we have omitted the data from two new courses which each reported using 10 million gallons in 1992.)

	No of courses ³	1990	1991	1992
<i>PWS-only courses</i>				
Information for all three years (Q6)	16	3.97	3.77	2.85
1992 information only (Q6 & Q7)	39	3.76 ^a		2.70
<i>DAs-only courses</i>				
Information for all three years (Q6)	9	3.32	2.86	2.23
1992 information only (Q6 & Q7)	27	5.42 ^a		3.64
<i>All courses</i>				
Information for all three years (Q6)	40	6.36	5.07	3.79
1992 information only (Q6 & Q7)	84	5.42 ^a		3.23

Table 1: Average Water Quantities Used on Courses¹ (Megalitres²/year)

Notes

- (1) Strictly speaking data refer to responses received and therefore to complexes rather than courses. Virtually nothing is known about irrigation of separate components of > 18-hole complexes; we therefore apply our water use averages to courses, although average course use will be lower than the average complex use data listed in the table.
- (2) To convert data to millions of gallons per year, divide figures by 4.546.
- (3) Number of courses providing this information < 100% of sample.
- (4) As explained in the text, the 1990 estimate in italics is derived by multiplying → 8

GOLF COURSE IRRIGATION

the average 1992 course use (derived from the much larger number of courses reporting 1992 information only) by the 1990/1992 ratio for the courses reporting information for all three years. In this way, we make maximum use of the available information.

(5) Q.6 and Q.7 refer to question 6 and question 7 in the questionnaire.

Averages for 1992 were lower than earlier data for two reasons: the wetter weather in many parts of the south and east from June onwards, plus some restrictions on watering in earlier months. Without further study it is impossible to establish the extent to which the 1992 averages reflect restrictions-suppressed and therefore less than 'true' demands. We are thus inclined to label the '1992 information only' figures for 1992 as demands relating to a climatically 'average' year, and those for 1990 (in italics) as our best estimates for a 'hot, dry' year. 1990 estimates have been calculated by applying '1992 information only' to 1992 averages, the 1990/1992 relativity factors established from courses providing data for all three years.

Results: courses using only mains water reported using an average of 2.70 Ml (about 600,000 gallons) in 1992; we estimate the corresponding average for 1990 to be 3.76 Ml, 39% higher. Courses using only direct abstractions (from borehole, river or lake) irrigated an average of 3.64 Ml (800,000 gallons) per course in 1992, and 49% more than this in 1990. For all courses for which we have information, however, the estimated averages were 3.23 Ml (710,000 gallons) in 1992, and 68% more than this in 1990. For courses using both mains water and direct abstractions, the average quantity irrigated was higher: 5.50 Ml (1,210,000 gallons) in 1992. Based on the responses of only eight courses providing the relevant information, 53% of this was from the PWS and 47% from direct abstractions.

These average figures hide very skewed distributions; for all categories of courses the most frequently reported irrigation use was in 1992 between 200,000 and 400,000 gallons (0.91 to 1.82 megalitres).

If our sample of 114 courses is typical of the 800 estimated in the south and east, it is possible to estimate that total golf course water use in 1990 in the five NRA regions was 1601 megalitres from the PWS and 1618 megalitres from DA's (assuming that water taken from courses' own storage in that year was balanced by new water drawn from piped supplies or from abstractions). In other work undertaken for the DoE we have estimated total PWS industrial and commercial use in the south and east to be 1939 Ml/day in 1991 and total abstractions for all spray irrigation at 170 Ml/day. This therefore suggests that golf course irrigation use represented 0.23% of the PWS and 2.6% of total spray irrigation in 1990.

These percentage shares of course take no account of seasonal distribution. Because of the concentration of irrigation in May to August, golf course use may represent nearly 1% of total PWS industrial and commercial use over this period of the year.

Costs and Timing of Water Use

60% of respondents provided information on costs, and, as would be expected, water costs are significantly higher when there is reliance

on the PWS. Annual costs for 24 PWS-only courses ranged from £400 to £5000, with an average of £2100; for 15 courses using only direct abstractions, costs ranged from £34 to £2350, with an average of £308. All 49 courses reporting cost data revealed average 1992 water costs of £1582. Turf Management had reported a 1986 figure of £645, suggesting an increase of nearly 150% over the last six years (although the regional difference in the surveys should be noted).

All 89 responses gave information on water use timing. Only ten clubs claimed to use water in April, and even then it was generally only 5% of annual use. 44 clubs used water in May (mostly 10% of annual use), but 80 watered in June and 87 in July. 68 irrigated in August and only 16 in September. The most common pattern was to use 10% of water in May, followed by 30% in June, 40% in July and 20% in August.

What if the Price of Water Were to Double?

It is likely, whether or not global warming occurs as predicted, that the real price of water will continue to increase significantly over the next decade. For PWS's this trend is already very clear, while for DA's incentive-based charging schemes are now the subject of public debate. We wished to sound out those responsible for course irrigation management as to their responses to a large increase in the price of water, and so we hypothesised a doubling of real price and presented various possible reactions for checking.

	No of courses responding	Yes	Maybe	No
<i>Reduce water application (with existing techniques and resources)?</i>				
PWS-only courses	37	30%	27%	43%
DA's-only courses	27	26%	19%	55%
Mixed courses	15	20%	27%	53%
All courses	79	27%	24%	49%
<i>Construct more storage capacity?</i>				
Courses with no storage	37	38%	27%	35%
Courses with some storage	44	39%	32%	29%
Courses with PWS and DA's	16	69%	31%	0%
All courses	81	38%	30%	32%
(Average water costs of 'all courses' groups)	(44)	(£2320)	(£1650)	(£1250)
<i>Change irrigation technique/technology?</i>				
Present technology: automatic	62	40%	36%	24%
Present technology: manual + hose points	7	71%	29%	0%
Present technology: mixed	6	50%	17%	33%
All courses	75	44%	33%	23%
(Average water costs of 'all courses' groups)	(40)	(£1880)	(£2030)	(£810)

Table 2: Responses to Water Price Doubling in Real Terms

Two respondents complained about recent trends towards sandy top dressings on greens and tees, with one complaining this had probably doubled water use on a particular course in the last seven years.

The first question, about application (would a doubling in price 'affect the amount of water you apply with existing techniques and sources?'), is essentially about a short-run decision, implicitly assuming irrigation technique and equipment to remain unchanged. Only a quarter said they would cut back water use. Another quarter might, but half thought they definitely would not. These results are unsurprising; when courses are 'locked' into a certain irrigation system, there may well be only limited scope for economies in use. There were no significant differences in the average annual water costs of courses answering yes, maybe and no.

On the question of more storage, involving a once-and-for-all investment (and therefore a longer-term) decision, there was more interest. Overall, nearly 40% of the 81 courses responding thought they would be induced to construct more storage by a doubling of water prices and only one third thought they would not. Significantly, the present average annual water costs of 15 courses saying 'yes; more storage' were nearly double those of the 14 courses responding negatively. This accords with what economic analysis would predict. On the other hand, it was surprising that courses with no storage at present seemed no more interested in additional future storage than those already having storage facilities. Courses with mixed supplies, perhaps already alive to the dangers of water scarcity, were particularly interested in adding storage in the event of a large price increase.

Even more interest was expressed in changing irrigation techniques and technology if the price was to double in real terms. Nearly half of all courses registered a definite 'yes', and

GATION A NEW STUDY

less than a quarter ruled this out. Again, economic factors seem to be at work here: the courses answering 'yes' or 'maybe' have at present average water costs more than twice as large as those registering a firm 'no'.

Further Information about Water Use

We invited greenkeepers to offer other relevant comments or information about course water use, especially in relation to the possibility of global warming, and 34 (38%) responded to this request.

Reactions covered a wide variety of aspects of course irrigation, with most frequent mention being made of the need to produce and encourage more drought-resistant grasses for a warmer climate and of current and future plans to construct reservoirs for on-course storage. Typically these provide storage of between 1.5-2.5 million gallons (7 to 11 megalitres), and one current application was described for a licence for two borehole abstractions, to fill two large course water haz-

ards which would also serve as reservoirs for use when mains water was restricted or became too expensive.

Two respondents complained about recent trends towards sandy top dressings on greens and tees, with one complaining this had probably doubled water use on a particular course in the last seven years. Two more drew attention to greater use of courses leading to compaction and hence greater run-off and therefore even more water being needed. As though in response, another two reactions drew attention to the usefulness of tining turf regularly in the peak summer season to assist water penetration.

Two clubs pointed out the usefulness of misting irrigation in very hot weather and two more saw great virtue in the use of wetting agents (one recorded a 'dramatic reduction' in water use after using a 'hand hose with wetting agent gun plus a monthly blanket wetting agent').

The influx of U.S. irrigation technology was

criticised ('different conditions and different budgets there'), but another respondent was pursuing US style plans to treat the effluent from the clubhouse and an associated hotel, hopefully to supply up to 4000 gallons (18000 litres) per day for course watering.

Other comments covered supply restrictions and the need to modify the game itself as well as balls and clubs for warmer conditions. Finally, three East Anglian greenkeepers claimed they would be unlikely to lose sleep over future water shortages induced by climate change since the same phenomenon would most likely ensure their courses were completely submerged by rising sea water!

■ This is an abridged version of the document 'Golf Course Water Use', a 16 page study document by Paul Herrington and Martina Hoschatt. Copies are available from the University of Leicester, Economics Department, Leicester LE1 7HH, price £1.50 including postage - cheques, made payable to The University of Leicester, should be sent with order.

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One does not see so much today of the root break phenomenon on putting greens, partly because most greenkeepers (though sadly not all) believe in and practice much more aeration, if only to counteract the compaction caused by ever-increasing play. Other sound practices, especially regarding top dressing, help to avoid the problem. Few will admit to having such a problem (unless they have inherited it) as in most cases it is the result of bad greenkeeping methods, albeit often started many years earlier.

I have, even to this day, vivid memories of this situation, dating back many years. Three in particular demonstrate the symptoms, if not the cause. First is the sight of long strips of greens being rolled up like a Swiss roll on drum-type aerators, in the absence of any anchorage, with a severe root break just below the surface.

Another is the sight of white grass leaves growing under the lifted turf, contrasting with green leaves above. The turf, finding air if not light under the sod, produced leaves not roots, presumably in some doubt as to which way up it was!

Thirdly was the sight on so many courses, so proud of their nice green greens, of the turf on a putting green lifting like an enormous blister, a foot or more above the putting surface simply by inserting a fork nearly horizontally and raising it, when the turf rose with it. When the fork was removed the blister subsided with a hiss of escaping air! All such shallow rooted greens were very drought susceptible and consequently were always heavily watered, with the inevitable result that the grass type changed, because of shallow surface rooting conditions, to annual meadow grass, making matters worse in a vicious spiral.

The cause of such root breaks is simply identified. It is almost always due to changing the top dressing in physical character and quality. This most commonly occurs when heavy sanding had earlier been carried out, often in a misguided attempt to firm up soft, soggy putting surfaces. There is one golden rule in top dressing and that is that it should be consistent. Ideally it should be the same as the root zone, but in our less than perfect world this is not always possible or sensible. With new greens built with specially mixed, sandy, humus-enriched root zones, it is sensible and easy to use the same mix for top dressing to ensure a consistent and uniform profile right down to the stone carpet. If however, as I have seen recently, the root zone is very unsatisfactory (in a specific case something like 25% of fines and virtually no humus, poor draining and root inhibiting) what do you do? It would be silly to use a humus-enriched sandy top dressing, as the roots would have no incentive to delve deeper for nutrients, and improved surface conditions would encourage shallow rooting annual meadow grass. Using the same awful root zone mixture would seal the surface and cause flooding, poor drainage after rain, and soft putting surfaces. Pure sand is the alternative - and inevitably causes root breaks.

Worse still, when heavy sanding starts to show problems, advice is unwisely proffered to change the mix - and then one really is in trouble. After a fairly short time, the grass lives on the top. There is no attraction for roots to penetrate sterile and often compacted (because humus-free sands and soils become destructured and consolidated) layers beneath. This in a way is comparable with a perched water-table green where successive layers 'fill' with water, and when the total water holding capacity of that layer has been reached then the water can flow to the next layer (as its weight