

) RRG % L R W H U U R U L V P

% HWW\ :HGPDQ 6W /RXLV

/LFHQVHG 1XWULWLRQLVW DQG (QYLURQPHQWDO +HDOWK 6SHFLDOLVW 86\$

&R UU H V S R D Q X G W \ K B E H W W \ : H G P D Q 6 W / R X L V / L F H Q V H G 1 X W U L W L R Q L V W D Q G ( Q Y L U R Q P H Q W D O + H D O W K 6 S H / D U J R ) / 7 H O ) D [ GU E H ( P D L O E H W W \ Z H G P D Q V W O R X L V F R P

5 F H L Y H G - Q D W B I U \ \$ F F H ) S H E R / Q D G D W H 3 X E C O D M K P H K G G D W H  
& R S \ U L J K W \ 6 W / R X L V % : 7 K L V L V D Q R S H Q D F F \$ V V W K V H L F O K D E W V V V U L L O X O M H G W K D D H W H W K H W H R U S W R I F  
G L V W U L E X W L R Q D Q G U H S U R G X F W L R Q L Q D Q \ P H G L V P P S L O D M R H G S R R H U R G H W P A Q W L W K Q U P D Q N R X U V H W  
W U H D W P H Q W Z R X O G E H F R P S U R P L V H G

\$EVWUDFW

3RWHQWLDO 3ORWV RQ 86 )RRG DQ

(YHVLQFHSHWPEHU \$PHULFDQ VRFLHW\ KDV KDG LQFUHDVHG DZDUHQHV  
SRVVLEOH WKUHDW RI DQRWKHU WHUURP\LVW\ DWWDFN RQ 8 6 VRLO 7KH \$PHULFD  
VDIHvw IRRG VXSSO\ LQ WKH ZRUOG ZKLOH D IRRG VFLHQFH FRPPLWWHH UHSF  
FULWLFL]HG WKH DELOLW\ RI WKH )' \$ WZR RYHQ\ HSHQGHQ\ W\ SOR\W VLGHYDQZHHSU  
%RDUG 7KH %RDUG LQGLFDWHEGRKDP\ LFDQ\HB JWHQFWR R\ SURGXPA BKHWRKUF  
PDUNHW WKH )' \$ LV XQDEOH WR NHHS XSVZLWKW\H\ Q\FLHOLW\H\ FQHDLFK WRHY  
FKHPLFDOV DUH URXWLQHO\ DOORZHG RQ WKH DUNHW\H\ Q\FLHOLW\H\ FQHDLFK WRHY  
FXWDQH RXV\ J DVWURLQW\H\ WLQDOO\ SUR

.H\ZRUGV %LRWHUURULVP )'\$ &RQWDPLQDWLRQ 2OH VFKHPH XVHG VSRUH FRQWDPLQDWL  
6LQFH LW LV GLIILFXOW WR NLOO WKH VSF  
WURXJK ZRUNHUV QRW YDFFLQDWHG ZRXC  
, QWURGXFWLRQ

(YHU VLQFH 6HSWHPEHU \$PHUWFDPURBEVHW\WKRWS\$DGDGQFURDNAGRYHU  
DZDUHQHVV RI QDWLRQDO VHFXULW\ DQGRWKH WRMLVLEOLHDWLURQDWVRMHPQRUWKH  
& HQWHU IRU )RRG 6DIHW\ DQG \$SSOLHG 1XWULWLRQ DQG & 90 & HQWHU IRU  
9HWHULQDU\ OHGLFLQH VLQFH WKH\ KDYKHDUBWKHUSQPWLQYDQGJUHWKRXZFKH  
DZD\ IURP )'\$ V DELOLW\ WR GHYHORS WRKAKHPLVQDPRXEVWKGHWWDVWRUXPHWUQ  
QHHGHG WR HIIHLHQWO\ SURYLGH URXWQDPRXEVWKGHWWDVWRUXPHWUQ  
LQYHVWLJDWLRQV WR SURWHFW WKH \$PHUWFDPURBEVHW\WKRWS\$DGDGQFURDNAGRYHU  
6FLHQFH WHUURULVW JURXS FURVVHV LQWR WKH

\$Q DVVLJQPHQW IRU ODVWHUV RI 6FLHHQFH) HZ XSHVLSVOLR QRXW QGHQHQV FDRQ VILGHU  
<RUN &KLURSUFWLF &ROOHJH LQ )RRDG QFKHH QRXUFQDRI WIRFIVLQ HLO ORQH WKHRZ C  
VHFXULW\ RI RXU IRRG VXUYHLOADQFH WRV GHP DDFKWDYQ GUHQW CZO VRW RXGHNHYH&RS  
WHUURULVW VFKHPH WKDW ZRXOG DSURQXFWKLRQ8 RI MRLGLV TSQDWKUDO .DV  
ELRFKHPLFDO DJHQW FRXOG EH IRRG RU ZDWHU EDVHG DQG QHHGHG WR EH  
VXIILFLHQW WR SURGXFH D UHDOLVWL(FRQRPDW WRDWHY KURP DQWSKHPPLVHQW  
QDWLRQ V FRQILGHQFH LQ RXU IRRG VXSSOJ VWDQJHULQJ 7KRXVDQGV RI SHRSOH ZRXO

7HQ RXW RI WKH WZHQW\ VWXGHQWV SURYLGHG RXWVWDQGLQJ IRRG DQG  
ZDWHU WHUURULVP VFKHPHV WKDW LOOXVWUDWHG KRZ HDV\ ELRORJLFDO ZHDSR  
FRXOG FDXVH PDVVLYH LQMXULHV HFRQRPLF GLVUXSWLRQ DQG HURGH  
FRQILGHQFH LQ WKH IRRG VXSSO\ 7DEOH

5LFLQ

5LFLQ LV D SURWHLQ WR[LQ IRXQG LQ WKH SXOS RI FDVWRU EHDQ SODQWV > @  
 2QFH ULFLQ HQWHUV WKH FHOOV RI WKH ERG\ LW LQKLELWV FHOOV IURP PDNL  
 SURWHLQV WKH\ QHHG WR VXUYLYH \\$V FHOOV EHJLQ WR GLH WKH RUJDQV EHJ  
 VKXWWLQJ GRZQ DQG WKH ERG\ GLHV > @ 5LFLQ FDQ EH LQJHVWHG LQKDOHG R  
 LQMHWLQH DV D WR[LQ ZLWK GLIIHUHQW V\PSWRPV UHVXOWLQJ IURP WKH URXWH  
 H[SRVXUH > @ 7KH PRVW GHDGO\ IURP RI ULFLQ LV WKH SXULILHG SRZGHUHG  
 IRUP DQ DPRXQW WKH VL]H RI D SLQKHDG FDQ NLOO DQ DGXOW > @

%LRORJLF	06\$B\$W\$PV	&RQWDPLQDWLRQ
\$QWKUD[	9RPLW GLDUUKHD V\PSWRPV	QDUXDVLQD\ FOXU KODLNH IORXU
5LFLQ	9RPLW GLDUUKHD 'HK\GUDWLRQ VHL]XUHEWIIHW %HHU EUHZHU\ +\SRWHQVLRQ	)RRGMD XW\$HDD\HG RQ
6KLJHOOD	9RPLW GLDUUKHD PXFXV VWRRO	FODRSGIXEH )WHYHFWMLRQ RI VXSHUPDUNHW
&ORVWULGL &U\SWRVSR	XPRPLW K\SHU VHFUH UVGLW\RP VKXW GRZQ \$EGRPLQDO 3DLQ )HYRQWR SURGXKFH VXSHU PDUNHW	WDLVRQ VRIGI WMRVWDXUDQW 98RWWOLQDXXPHD 6SUD\
6DLWRLQ	/XQJ SDUDO\VLV 'HD WKRFLQV&UD	DHG DV DHURVRO LQ
&RPSRXQG 6RGLXP 0RQRIOXUR	+\SRWHQWLRQ \VU\WKPLDV 5HVSLUD	36HIS]DXWIIHG D:\WU\UVW\XSS\O\ )UXLW -XLFHV

7DEOHRRG DQG :DWHU %LRWHUURULVP \$JHQWV

0RVW V\PSWRPV DVVRFLDWHG ZLWK LQJHVWLQ RI ULFLQ PDNH D SHUVRQ  
 EHOLHYH WKH\ KDYH IRRG SRLVRQLQJ RU D IOX VR WUHDWPHQW ZRXOG EH  
 GHOD\HG DQG GHDWK VRRQ IROORZV

\$ QRYHO LGHD RI XVLQJ ULFLQ DV D WHUURULVW SORW LQYROYHV WZR SRVVLE

&LWDW16RWQ/RXLV %:

)RRG %LRWHUURULVERL%LRWHUURU %LRGHI

3DJH RI

6D[LWR[LQ

SURYLGH ZDWHU VHUYLFHV WR PRUH WK

\$UJXDEOL WKHVH VIVWHPV UHSUHVH&W W  
DEVRUHG KLJK FRQFHQWUDWLRQV RI UHG WLGH YKLV KDUPIXO DOJDH EORP  
LV UHVSQRQVLEOH IRU LVRODWG GHDWKV DQGURAXAWHRARRL & RSPRSRVRQG QJ ZFRKX  
FRQWDPLQDWG VKHOOILVK SDVV XQQRWQGDHQWLQWRKWRN MDRQY HX SRSLO S XPSI H W D  
DUH DOVR D VRXUFH RI VD[LWR[LQ UHDFK WKRXVDQGV RI \$PHULFDQV XQGHW

VHW LQ 7KH ODFN RI DQ HIIHFWLHY DQW  
GLQRIODJHOODWHV LQ D UHPRWH RU XQGHUJURXQG PDULQH ZDWHU VRXUFH 2QF  
DGHTXDWH WR[LQ LV SURGXFG LW FDQ EH GIVSHUVHG EV DHURVRO LQW  
DLUSODQHV WUDLQV RU EXVHV %UHDWKLQJ WKLWRLQ FDXVHV SDUDOVLV LQ  
OXQJV ZKLFK OHGV WR GHDWK E\ DVSK\ [L\$ DIUH VRFLHW\ ZLOO DOZD\ V KDYH H[S

\$ V D WDVWHOHV FRORUOHVV WRTLQJ DQFH LQ DQG VFKH AQQDQFH VDQG VFKH AQQDQFH  
LQ WKH V DQG XVHG LQ D FDSVXOH YIRQW VDQG VFKH AQQDQFH VDQG VFKH AQQDQFH  
SLORWV \$ WHUURULVP SORW RI VSUDQJQBXWV KHRWHLQ WLRQW VFKH AQQDQFH VDQG VFKH AQQDQFH  
UHDOLVWLF DQG GLIILFXOW WR GHWFW DQG VDQG VFKH AQQDQFH VDQG VFKH AQQDQFH  
WHVWLQJ LV WKH RQO\ NQRZQ PHDQV RYHFDQXDWG DQV WKRW VDQG VFKH AQQDQFH VDQG VFKH AQQDQFH  
WKLW RLPH KDYH QRW EHHQ WDNHQ WR IRUHVHH KRZ  
IRRG VXSSO\ VDIH IRU DOO \$PHULFDQV

6RGLXP ORQRIOXURDFHWDWH

5HIHUHQFHV

\$ SRWHQWLDO WHUURULVW DJHQW ZLWK OLWWOH FRQVXPHU DZDUHQHVV LV VRG  
PRQRIOXURDFHWDWH RU & RPSRXQG )'W6FLHDFH & RPSRXQG FRTFSRQFH DQG  
VROG DV D SHVWLFLGH IRU URGHQWV DQG VFKH AQQDQFH VDQG VFKH AQQDQFH  
FRORUOHVV RGRUOHVV DQG OLJKWO\ ZDWHU VDQG VFKH AQQDQFH VDQG VFKH AQQDQFH  
WKH IRRG VXSSO\ 7KH & GRHV QRW LQGLFDW DQG VFKH AQQDQFH VDQG VFKH AQQDQFH  
VRGLXP PRQRIOXURDFHWDWH IRU GLDJQRVLY 34HSRVXUH 5REHUWV VFKH AQQDQFH VDQG VFKH AQQDQFH  
& HQWHU IRU 'LVHDVH & RQWURO DQG 3UHYH QWV DQG VFKH AQQDQFH VDQG VFKH AQQDQFH  
FRDQJRW DQG GHVWDELOLHV WKH OLSLG E

5HSHDWG ORZ GRVH HSrvxuh FDQ EH DQFH DQJ WKA&QFKHJUPL FDUO 'LV  
YHUI GDQJHURXV IRU WHUURULVP VFKH AQQDQFH & OLQLFDQ HIIHFVW GHYHORS  
PLQXWHV WR KRXUV DIWHU HSrvxuh E\ DQFH DQJ E\ FGQOWKHWBMLFORQJWVQ RI  
KRXUV 1R NQRZQ DQWLGRWH LV DYDLODEOH DFFRUGLQJ WR WKH &  
& RPSRXQG LV PDQXIDFWXUHG E\ DQFH DQJ E\ FGQOWKHWBMLFORQJWVQ RI  
\$ODEDPD GHVSLWH LWV EDQ LQ WKH 86 6QULDOGHSUWV WLRWVW KHWBMLFORQJWVQ RI  
LQ D SRZGHUHG IRUP OLNH WKH RQH IRXQWV DQFH DQJ E\ FGQOWKHWBMLFORQJWVQ RI  
+XVVHLQ V FKPLFDQ WHUURULVP ODE FFRUGLQJ WR WKH RQH  
DGGWLWLRQ HSruwhg EDQQHG SURGXFWQW VFKH AQQDQFH VDQG VFKH AQQDQFH  
\$PHULFDQ IRRG VXSSO\

3URXG ISRTA\ DGEHOU\ 9DOH - \$ IOXRRUGDFXPH D

6HYHUDO PHWKRGV E\ ZKLFK & RPSRXQG VFKH AQQDQFH VDQG VFKH AQQDQFH  
DV D WHUURULVP DJHQW LQFOXGH DGGLQJ KAPLFDQ WDKH WODDSDUHG IRRGV  
UHVWDXUDQWV RU FDWHUHG HYHQWV VFKH AQQDQFH VDQG VFKH AQQDQFH  
SDUW\ RU LQWURGXFG LQWR WKH PXQLF ZDWHU VFKH AQQDQFH VDQG VFKH AQQDQFH  
\$ UHSRUW E\ & RQJUHVVLQDO 5HVHBU\ 6AU&RPH VWDWV

\$ IDLUOI VPDOO QXPEHU RI ODUJH GULQNLQJ ZDWHU DQG ZDVWHZDWHU  
XWLOLWLHV ORFDWHG SULPDULOI LQ XUEDQ DUHDV DERXW RI WKH VIVWHP